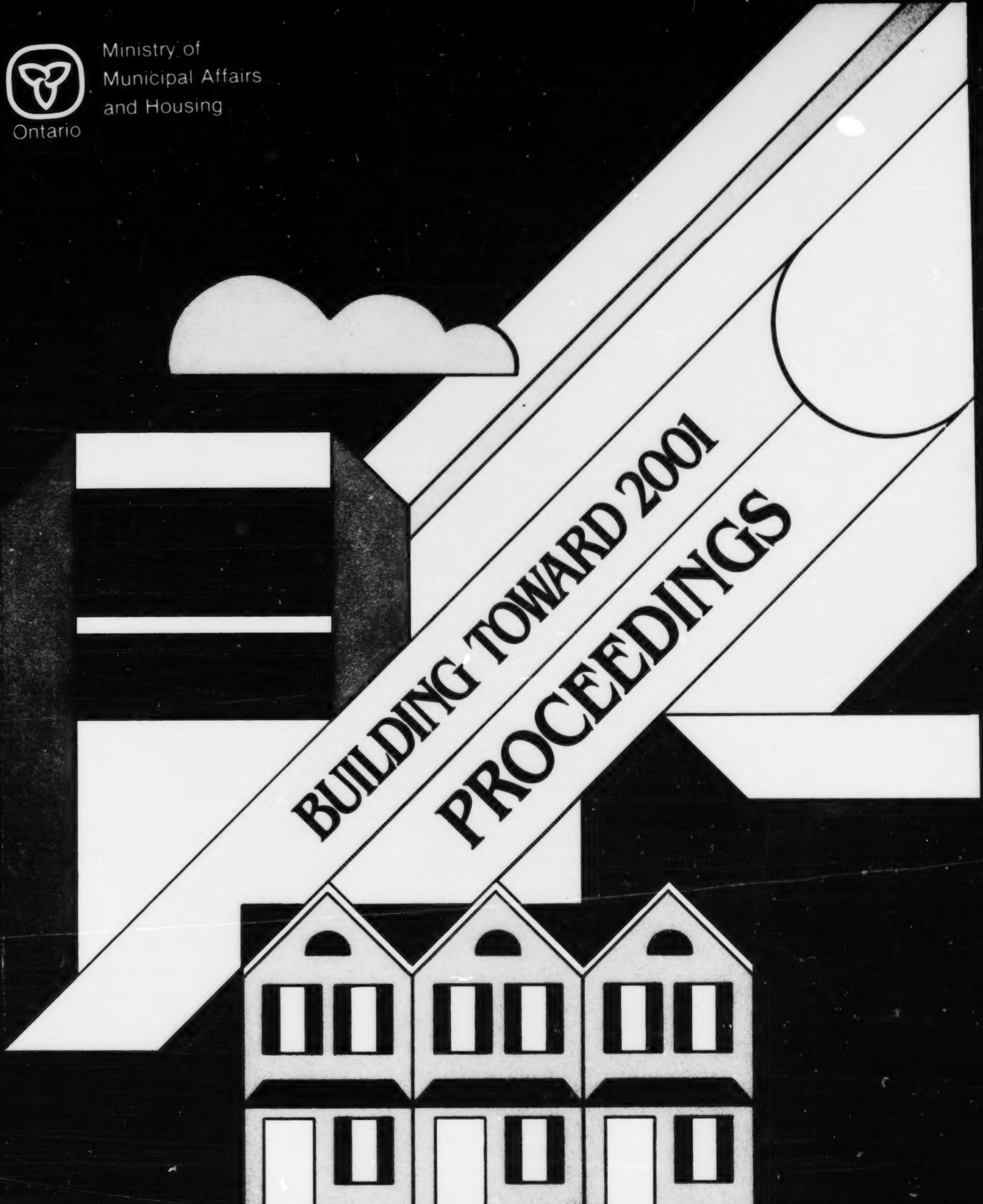
Ministry of
Municipal Affairs
and Housing

Ontario



BUILDING TOWARD 2001

PROCEEDINGS

November 1-4, 1981

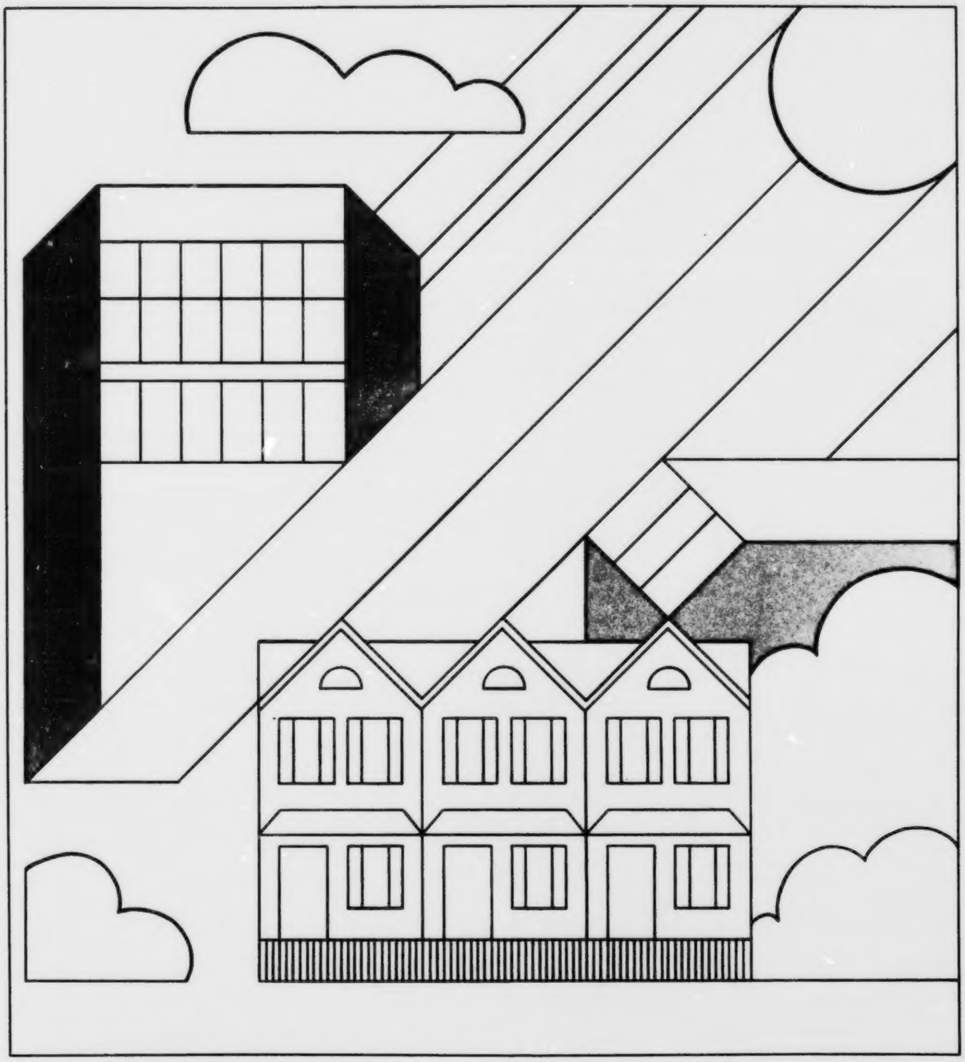
Ontario

Ministry of
Municipal Affairs
and Housing

BUILDING TOWARD 2001
PROCEEDINGS

November 1-4, 1981

edited by Gary Ralph
and George Przybylowski



Any statements or opinions expressed herein are those of the writers or of persons quoted and, unless otherwise noted, are not necessarily endorsed by the Ministry of Municipal Affairs & Housing or by the Government of Ontario.

Copies available from:
Ontario Government Bookstore
880 Bay St.
Toronto, Ontario M7A 1N8
Price $10.00 payable in advance to the Treasurer of Ontario

Hon. Claude F. Bennett
Minister

W. Cornell
Deputy Minister

TABLE OF CONTENTS

Plenary Session
Mark Lapping
Roger Sant
Arthur Johnston
Michael Dennis

HOUSING RENOVATION
1 Planning For The Renewal Of Existing Housing Stock
Ray Spaxman
Guy Legault
Bruce Davidson
Stephen McLaughlin
Questions & Answers

THE RENOVATORS
2 A Look At Codes And Regulations Affecting Residential Renovations
Terry Mills
George Banz
Frank Burcher
Tony Suprun
Roy Phillippe

3 Prospects For The Housing Renovation Industry
Andrew Wilson
Greg Lampert
Gerald Greenberg
Rob Kaufman
Questions & Answers

RENEWAL ISSUES
4 Housing Renewal: Financial Issues
Jim Brooks
Gerry Greenberg
Jack McCreadie
Barry Lebow
Questions & Answers

5 Housing Renewal: Municipal Issues
Mel Winch
Harold MacDonald
Paul Harper
Rupert Dobbin

6 Housing Renewal: Design Issues
Martin Weaver
Peter Gabor
Donald Kerr
Questions & Answers

7 Present & Future Lifestyles: How Will They Affect Housing Renovation & Energy Conservation?
Dr. Robert Logan
Neal Peirce
Sally Lerner
Andy Brethour
Questions & Answers

HOUSING AND ENERGY

8 Integrating Housing And Energy Conservation
  Dennis Rogoza
  Harold Orr
9 Energy Conservation Technology In New Housing
  Douglas Carl
  Gus Handegord
  Hugh Heron
  Keith Funk
  Questions & Answers
10 The Building Envelope
  John Hix
  David Eyre
  Brian Marshall
  Questions & Answers

ENERGY SAVING

11 Weatherizing And Caulking
  David Peters
  Sebastian Moffatt
12 Home Heating: Energy Alternatives
  Gord Patterson
  Juri Otsason
  Harry West
  Dr. Erwin Fernbach
  Dr. William Stevenson
  Questions & Answers
13 Housing Energy Management Products
  Greg Allen
  Zane Shaw
  Bruce Dodd

SELLING CONSERVATION

14 Marketing Energy Conservation
  Dr. Gordon McDougall
  Sandra Rennie
  Allan Gregg
  Ed Kulperger
  James Leach
  Questions & Answers
  Charles Simon
  Goldie Edworthy
  James Moodie
  Questions & Answers
15 Consumer Education In Energy Conservation & Housing Renovation
  Louise Landry
  Lucille Brisebois
  Questions & Answers

AIR CHANGER
ALLEN·DRERUP·WHITE LTD

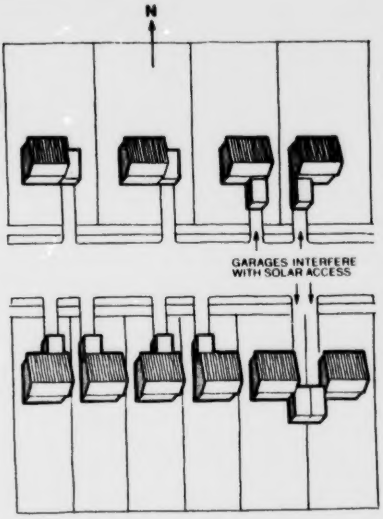
DESIGNING CONSERVATION

16 Saving Energy Through Site Design And Community Planning
John Donahee
Gregory Ross
Blandford Gates
Rob Wright
Vladimir Matus

17 Design For Climate
John Page
Arnie Fullerton
David Geiger
Questions & Answers

18 Making The Liveable Winter City
Rick Lawford

19 Underground Homes: Earth Shelters
Don Metz



ASSESSING CONSERVATION

20 Energy Auditing: Low Rise Buildings
Charles Wing
Questions & Answers

21 Energy Auditing: High Rise Buildings
Bob Tamblyn
Bruce Robertson
Ian Jarvis

22 Municipal Experiences In Energy Conservation
Doug Raven
Glen Wood
Dr. Tony Fuller
Questions & Answers

DEVELOPING COMMUNITIES

23 Residential Infill Development
Peter McInnis
Carolyn Kearns
Bob Truman
Barry Rose

24 Mixed Use Developments
Michael Kohler
Joe Berridge
Jack Friedman
Questions & Answers

25 Industrial Area Renewal
Tom Loebel
Peter Barnard

26 After Downtown And Main Street Revitalization
William Bowes
Gerry Parisien
O.D. Gay
John Cristo
Questions & Answers

Summary Session
Claude Bennett
Robert Welch
Gus Handegord
Peter Burns
Robert Theobald

PREFACE

The editing and production of these proceedings was quite a challenge. The "Building Toward 2001" forum featured 168 speakers and panelists over a three day period in some 32 workshops and seminars on a wide range of issues dealing with existing housing in the community, current and future housing trends, residential energy conservation, and community redevelopment.

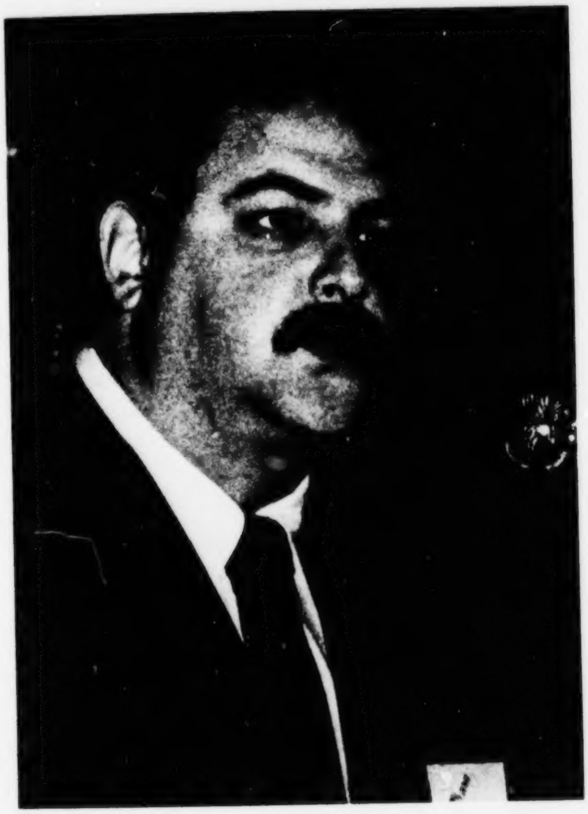
Some of the speakers relied heavily on audio-visual presentation formats, using slides or overhead transparencies. Many spoke from points rather than using a prepared text. A few used no written notes at all. Editing the transcripts of these sessions proved to be a formidable task.

As a result, the final proceedings contain most of the remarks of the majority of the speakers who did not rely heavily upon an accompanying visual presentation. While the proceedings were edited twice, in the interest of time, we did not undertake any major re-write of the transcripts.

It is our hope that most readers will be able to use these proceedings as a good reference source on the issues dealing with housing renewal and energy conservation. Cassette tapes of the workshops, including the question and answer portions, are available from Audio Archives in Markham, Ontario.

Gary Ralph
George Przybylowski

PLENARY SESSION



Mark B. Lapping:
Professor and founding Director of the University School of Rural Planning and Development, University of Guelph, Ontario. Professor Lapping is an author and a consultant to a number of U.S. government agencies, as well as the International Joint Commission.

It's a truism to note that population dynamics drive the housing market. The relative growth or decline in the number of people, aspects of family formation, family life cycles, migration and other factors of the demographic nature are key determinants of what types of housing will be built, where and when.

Housing is clearly the foundation of community development and the housing market is composed of individuals and families in constant flux who see, in their homes, far more than mere shelter. As we ponder the future of housing then, we must return to the most basic element of the housing market — people. What is happening to them, where are they choosing to live and what sorts of needs do they have which will be considered and must be considered in any housing strategy.

Before we move to a consideration of those current demographic trends in Canada which will shape the future of the housing market, let me briefly outline the modern history of Canadian housing and demographics. In the 60 years between 1900 and 1960, the number of occupied dwellings increased nearly 350 percent in Canada. This growth was consistent with general population growth and economic expansion throughout this period. This constitutes a steady and substantial increase with only low growth in those times when depression and war were ubiquitous throughout society. Likewise, a profound period of growth resulted when a pent-up demand for housing was finally released in the late 1940's and early 1950's. Regional variation in the number of dwelling units is explained by immigration, inter-regional migration patterns and shifts, economic growths and declined disparities among different places within the country.

Concomitant with the change of Canada from a rural to urban nation had been a significant shift in the type of dwelling which was occupied. In 1921, for example, only 2 percent of the total housing stock was in apartment types of dwellings. Fully 85 percent of all dwellings was single family detached homes. By 1966, approximately 1/3 of all dwellings were single family detached homes.

While the single detached dwelling is still the dominant type of construction among occupied units, apartment houses and single attached dwellings, the duplex, have come increasingly to typify much of the Canadian housing market. Moreover, most of the expansion in the single detached housing market has been located in the suburbs of cities rather than in the rural and hinterland areas of the nation. This too has been consistent with the overall change Canada has witnessed as it has moved from a rural society to an urban one.

In terms of tenure characteristics, Canadians have consistently opted for owner-occupancy. Only during the depression years, did the home ownership rate fall below 60 percent. This factor may help explain why the ownership-high interest rate equation of today is such a potent political and social issue. Consistent with this is the fact that the length of occupancy is greatest among owner-occupiers rather than renter-occupiers so the nature of the family cycle explains variations and trends for each of these groups.

A number of contemporary trends are presently observable which will affect the housing market in many profound ways. Chief among these is the decline in the overall rate of population growth. As a result of a steadily declining birthrate and the decline in immigration since the mid-1970's, the overall population growth rate is slightly over 1 percent. That fact is often overlooked but should not be discounted since immigrants tend to come to Canada as complete family units with the result that a higher rate of immigration has a disproportionately significant impact upon the demand for housing.

Another significant development is that the trend towards population growth and concentration in major population centres has been checked and even modestly reversed. While it may be premature to say that there has been a turn-around or a true counter-stream there is substantial ex-urban and rural growth not only in the rural farm sector but in the small and medium sized centres as well.

Along with this new rural growth factor, another element has emerged which will further stabilize the population of the largest centres. As resource development projects increase, especially in the energy field, a shift from the centre to the east and west will continue a process started in the 1970s. Certainly housing shortages in Calgary and St. Johns reflect this factor.

The growth of the one person or single person household is also an important population trend. Currently one of every six households in Ontario is a single. This is the disproportionately urban phenomenon and renter-occupied as opposed to owner-occupied households are more substantial than is the case throughout the entire housing market. In the eastern provinces, the incidence of one person households is lower than in the west where resource development opportunities, may to some degree, explain a large number of such households. The single person household appears to cut across all age groups though for different reasons and will be slightly larger or slightly smaller as a proportion of the future housing demand in the years to come. Finally, and perhaps the most dramatic of all demographic trends, is that Canada is becoming an aging society. In 1901, only five people in every 100 was 65 years of age or older. By 1976, this population changed to nine per 100. It is estimated that by the year 2001, 11 to 13 of every 100 people in Canada, will be 65 years of age or older. This will work out to be approximately 3.5 million of us. The aging of the Canadian population is the result of three key factors.

(1) A high birth rate in the early 1900s — 36 per 1,000;

(2) Substantial immigration between 1911 and 1931 — 2.6 million people came to this country during that period within an average age of approximately 20 to 35 years;

(3) Medical advances and a constantly higher standard of living which has led to a significant increase in life expectancy. Between 1931 and 1971, life expectancy has risen from 61 years of age to 73 years of age. These are all made that much more significant because of the consistant decline in recent birth rate and immigration statistics.

Another way to look at this is from the perspective of the national median age. In 1961, it was estimated at 25; by 1976, it reached 27 years of age. Unless things change radically and substantially, the medium age will continue to rise for the duration of the century.

From a provincial perspective, we can note that Ontario, for example, will likely add another two million people by the turn of the century. This is predicated upon a modest annual growth rate of approximately .5 to 1 percent. An increasing number of Ontarions will be 65 years of age or older. By 2000, 12 percent of the population of the province will be at least 65 years of age. A continually decreasing percentage of 0 to 14 years of age people will be observably declining from the present 25 percent to 19 percent of the total population. This means that a higher proportion of Ontarions will be of work age than any time in the last 60 years.

New household formation will likely decrease with th greatest demand for housing coming from this very larg working age sector. One person households will remain a substantial part of this population.

Extrapolating of future housing market from current demographic trends is loaded with pitfalls. Demographers long ago learned that direct linear projection forecasts and functions rarely work. Significant socio-economic factors such as the timing and number of marriages, divorce rates, mortgage interest rate policy, energy pricing and others all have the potential to modify or upset any projections or predictions. Nevertheless, let me outline a number of implications current trends tend to suggest.

(1) A shift to demand towards single family detached dwellings to serve the needs of the large number of households which were being formed in the 1960s. (2) Further movement away from highly concentrated population centres to smaller ones with the concominant demand for housing in these areas including rural and small town settings.

(3) Less need for new rental housing for newly formed households as well as housing for sale for first time purchasers or families with very young children as these groups illustrate decline.

(4) Growth in the elderly housing sector with a parallel need for locations with proximity to services, especially those of a medical nature.

(5) Substantial growth in the market amongst second and third time purchasers of houses, though this could be offset by a growing propensity toward renovation and upgrading as opposed to trading up.

(6) An increasing number of one person households especially in the attached or duplex sector of the marketplace and

(7) Continued high demand for owner-occupied housing with a continuing decline in rental housing demand. Aside from some structural issues related to the economic fabric of Canadian society such as the ability of future families and individuals to accumulate savings and the propensity toward home ownership, perhaps the most significant variable facing providers and financers of homes will be the nature of the demand among second and third time buyers. The key question, it seems to me, will be; will they be consistently trading up or will they be staying put, renovating and renewing. Likewise, tastes, locational preferences, immigration and inter-regional shifts due to the changing nature of economic opportunity throughout the country all will be critical to the nature of the future of housing demand in Canada.

Roger W. Sant:
President and Chief Executive Officer of Applied energy Services, Inc. of Arlington, Virginia and formerly head of the energy conservation activities of the U.S. government during the Ford Administration.

There is a current rage in Washington to talk about a word called an "oxi-moron". I don't know if you have ever heard that phrase but an oxi-moron is two incompatible words that are linked together in a title such as 'jumbo shrimp' or 'military intelligence' or 'TV News' or 'airline food'. I coined one last summer that many of you have probably experienced, 'family vacation'. The reasons oxi-morons are fun is because we have a sort of oxi-moron society going on in a way and paradoxes are probably more than the consistencies. Certainly we find with our new Administration the paradoxes are a great deal of fun and we hope that they don't continue to be that way.

One of the things I would like to do is present some data that perhaps creates a new oxi-moron and at least suggest that the phrase 'energy crisis' is an oxi-moron. That it may have been true at one time and it's not true now and it will be replaced in this period of time by a new phrase 'energy opportunity'. In fact the theme of this conference probably helps that a lot in terms of focusing on what the opportunities are because behind us lies the period of the '70s in which we had to accomodate some of these major economic disruptions that occurred with price rises but at this point, its probably accurate to say that 'energy crisis' is no longer an appropriate phrase.

To get there, I think you've got to change the context a little bit, because we need to look at the context of energy in a little different way.

I was struck a couple of months ago by a puzzle I found in an airline magazine (maybe airline magazine is another oxi-moron, I don't know). It was fun to play with it because it was a puzzle that had three series of dots, three series of three dots, that is nine dots in all in a square and the puzzle was to connect those dots with four straight lines that connected to each other. As I played it, I went across the top and down the side, across the bottom and up and, of course, that left the middle dot and then I kept fooling around with it and there was no way that I could make those nine dots connect with each other with four straight lines. All of a sudden, I realized that what my constraint was; I was trying to stay inside the dots, that is, I was trying to stay in the frame of those nine dots and when I realized that I could go outside the dots with a line that went beyond those dots, come back down and connect them and go outside the dots again. Well I don't want to go too far on this thing but I realized that's the problem I generally have and maybe we all have of staying within a constraint that doesn't really exist because the way to solve that problem was very easy. It was to get outside the dots. The context of that problem was limited by our perception of looking at those dots, not realizing that we had a universe beyond those and I suspect that the energy thing to convert it from a crisis to an opportunity is to go beyond the dots or to create a new context. The context I've chosen is to label it energy services instead of energy to get out of the frame of looking at BTUs or kilowatt hours or therms or barrels or gallons as being irrelevant. What's really relevant are the 'services' people get from energy. Energy is never consumed directly, it's always consumed in a system that provides heat or provides comfort or provides convenience or mobility. Whatever you want to label it, it's not energy because energy is never recognized by a consumer, at least the consumers I know, as having any relevancy to a particular need. What's important is the comfort of that home or that building space or the convenience of using appliances and so on. Getting outside of the dots really is defining energy in terms of the services it provides to people. It's sort of paraphrasing Humocker's phrase, it's energy as though people really matter.

All of those energy systems are fairly interesting to look at and as you look at those systems, you find that the non-energy components of those systems are much more important or at least equally important to the fuel costs, even with fuel costs what they are today. A heating system in the U.S. averages, for instance, about 50 percent fuel cost and about 50 percent the cost of the system, the furnace, the insulation, the controls and so on. Even in cooling, it's more like 25 percent of the cost is the fuel cost; the rest is the cost of the air conditioner or the heat pump and the business opportunities that we see in the next 20 years are on the non-fuel side. The fuel side may be interesting and you may be wanting to invest in your oil and gas deals, that's fine but the real opportunities, the new opportunities for the next two decades are going to be on the non-fuel side, the side in which most of you have some expertise.

The best buys are going to be efficient furnaces. The best buys are going to be heat pumps replacing existing electric heating or the best buys are new control systems. Let me give you an example. We just published a booklet which we call the 'Eight Grade Energy Myths'. It was really focused on the United States. We are trying to look at the eight things that have been the backbone of our attempts to develop an energy policy. We concluded, surprisingly to ourselves, they are all mythical. At least they are mythical at this point. They may have been accurate at one point but they are no longer.

Let me just site a couple of numbers to show you why we came to that conclusion. We looked at things in terms of just energy services as I've described and then we've said, let's assume we have a very simple objective and that's to provide those energy services at the least possible cost. For the moment, we will forget our environmental concerns or our national security concerns or whatever concerns seem to pop into our mind when we think about energy. Let's just think about a consumer getting what they want at the least possible cost. We've calculated that with the gross national product of the United States up 72 percent over the next 20 years energy use would only be up 11 percent if we can have a least cost system and, more striking, if GNP was up by about 37 percent which is our current forecast in the next decade, between '80 and '90, the energy use would actually be down a little over 2 percent. So the improvements we see in productivity are not coming about because people suddenly have caught on to a conservation ethic or suddenly some penetrating religious fervour has taken place. We are not taking the responsibility for the planet. There seems to be an incredible move towards minimizing costs and that cost, that economic incentive, is what seems to be driving the situation. More important to this conference is what we see happening in the building sector or what we see could be happening in the building sector. We find that, in the 1980s, energy used in the building sector in the U.S. could be down about 31 percent even though we project residential housing to increase by 25 and commercial square footage to increase by 45. But perhaps the most exciting thing is if the average person in the U.S. were spending, let's say, $1,200 a year on energy services in buildings right now, we see that, by 1990, that same consumer would only be spending $1,100 or a decline of about 1 percent per year in real terms. The difference would be that, in 1980, the consumer is spending about 50 percent of the energy services they buy on fuel and, by 1990, we see that more like 35 percent. A combination of investment and better end-use devices, better services, looks to us like it may cause one of the real deflationary effects on the U.S. economy if we only take advantage of it. What will it take to make that happen is the subject here today. Well it is happening. In the U.S., some — we're down about 5 percent below the projection we made even for a least-cost economy. That is, the projection we made in 1978 right now looks like it will be about 5 percent below what we thought was a least-cost projection and some 10 percent below what the government forecast was at that time. In the last 24 months in the U.S., it appears that buildings are using about 8 percent less energy per square foot than they were about two years ago. So it is happening, something is going on now which is causing a major revolution.

I think what's even going to be more important is the creation of more consumer choices in the 80s and the 90s. People want to have choices about what they use so that they can choose between this system or that system or this cost and that cost. I don't think we can expect them to continue to make sophisticated choices amongst the pulse combustion furnace or electric heat pump or a blue ray furnace and put the appropriate amount of insulation in the controls with that. Consumers are not going to be able to do that and so the advent of what we might call the energy service company, the company that specializes in optimizing that mix of technologies and fuel, such that the consumer gets the lowest possible cost, is probably what we still see revolutionizing this whole area in the coming decade. Who will do that? It may be some utilities but it more likely will be new entrepreneurs, new companies that are focusing on minimizing consumer costs. There are lots of examples of that going on now. In Montreal, there's a company called "Montanay" that some of you may be aware of that's offering energy service contracts, which I find interesting. A Company called "Scallop" is doing the same in new York and Washington. There are the split-savings companies that are making all the investments for people and splitting the savings with their clients and so on.

When I was at Harvard, I had a professor who talked a lot about what he called 'marketing miopio'. His name was Ted Levitt and he published a classical piece in the Harvard Business Review in which he said, 'the major problem of railroads was that they never saw that they were in the transportation market. They kept thinking they were in the railroad market,' and that was his illustration. I think the major problem energy companies will have is if they continue to perceive themselves in the kilowatt hour market or the therm market or the energy market and not in the broader energy service market.

It's also appropriate to conclude with a story about a friend of mine who didn't make it through the two years at the business school because his number skills were not that great. His personal skills were fabulous. He was just a delight to have in a classroom but as he got through the end of the first year, he just couldn't pass the classes that required a lot of numbers so he left the school involuntarily to our dismay. About six years later, I ran into him on Montgomery Street in San Fransisco and to run into him was an understatement, he was in a Rolls Royce and it was a chauffered driven Rolls Royce and he had the cutest chick I've seen. I didn't even know whether I could stop him but I did and he was very glad to see me and we exchanged greetings and he asked me what I've been doing. I had some mundane comments so I finally got around to asking him what he's been doing. "I was really embarrased when I got kicked out of the business school. I just didn't know what I could do so I decided I had to start my own company and we make this thing for a dollar and we sell it for $5.00 and that 5 percent really compounds."

So it may be appropriate to say, in conclusion, all of the things that we talk about may need that kind of person. Perhaps the only thing that is standing between us and what I'd call a least-cost strategy is that kind of guy, that kind of person who is willing to get out there and do some things that are creative and really meet the consumer needs.

If 'energy crisis' is therefore becoming an oxi-moron, energy shortage, energy scarcity is equally an oxi-moron. The period of time in which we focused on energy because it was scarce is probably behind us. By 2001 this may turn out to be a remarkably stable state if we all do our jobs. It may be a remarkably stable state for the consumer who now may see new choices and new opportunities to reduce cost. Getting there should be an immense opportunity for all of us who are at this meeting.

Arthur Johnston:

Architect, from New York, Mr. Johnston is an expert on insulation and a director of energy conservation research for the National Association of Home Builders. He is president of Arthur W. Johnston & Associates, of Maryland.

I'd like to discuss with you just briefly from south of the border how we got into the mess we are in. In many cases, I see Canada following us technologically and in other ways and repeating our mistakes.

I am going to take a very quick look at the last 20 years of the United States' attitude. We went into what we called the 'Soaring Sixties'. John Kennedy and Jacqueline brought Camelot to the White House. It was a go — go decade, growth, growth, growth and the target was in that decade, we are going to land a man on the moon. We did land a man on the moon but there were dark clouds that were forming and we refused to see them.

We became a nation of assasins. We saw student unrest. We got deeply mired in South East Asia, playing ball under somebody else's rules on somebody else's court. The '70s became a sobering time to us. Initially, we went deeper and deeper into South East Asia. We landed up with double digit inflation. We landed upwith the first appointed President in the history of the United States. The biggest item of the seventies, history will probably tell us, was the Arab Oil Embargo.

When you give it a little thought, you come to the conclusion, not why did they do it but why did it take them so long to do it? In America, the reaction was furious. Gaslines. Some of us remember rationing lines but the newer generation had never been on a line in its life. Prices doubled. Gas line lengths doubled. New York City, of which I'm a native, likes to be a leader. Shortly after the embargo on the gas lines, a driver attempted to cut in the line in front of another driver. The second driver literally pulled out a pistol and shot him to death. We were furious, not at the cost of gasoline that had doubled so much but that we had to wait on a line. We then responded.

We came up with a program called "Project Independence" and it's very easy in hindsight to look back and snortle and sneer. Project Independence postulated increases in oil prices — what they called scenarios — $7.00 a barrel and $11.00 a barrel. I am not critical. We go at the time with what we have but we vastly underestimated what was really going on. President Carter declared a moral equivalent of war. The country responded much the way the male mouse lusted, as well as President Carter, after the female elephant. No way. The price of gasoline has again doubled but there are no lines and with no lines, people in the United States carry on BAU, 'business as usual.' We grumbled a bit on it but we are a resilient group; it's $1.40 at station A and $1.32 at station B, it doesn't bother us that $1.32 is four times what it used to be. We are saving eight cents and we feel good about it. What we don't see in the United States are the other impacts. While television news reports on occasion on energy items, usually the gasoline prices, we find other impacts right in our supermarket. Everything is packaged. We take that nice chicken home in its sort of plastic wrap package and its little plastic plate container and we don't recognize the petro chemical industry. Costs have gone up tremendously to that industry because of fuel costs. We think only in terms of two things, primarily our automobile and secondarily our utility bill. These are the only times we are aware of this situation that we are in.

We have two problems in the United States. One is called the internal combustion engine. Even at peak efficiency, we are only converting something on the order of 25 percent of the energy that goes into the tank. We use enormous quantities of electricity in the United States. On the basis of the raw fossil fuel content to the end use, there's a 32 percent efficiency of conversion. Combine these with all the rest of our market segments, and we find, in the United States energy economy, for every one unit of useful energy, we have to put two in the bank. To that end, what can we do? Well, we can increase the efficiency of our automobiles. We are making them smaller. We are making them lighter.

I, for one, drive a '71 Ford. I picked it up from a neighbour of mine because he was getting two new Volkswagons. He couldn't get anything on the '71 Ford. He said, 'do you want to buy my car?' I said, 'yeah, what do you want for it?' He said $20.00, just to get rid of it. I bought it for $20.00, I spent about $100 on it and, regardless of the price of gasoline, on a cost benefit basis, I have to drive that car 800,000 miles before I am in the hole. Oh, by the way, he gave me the snow tires free.

I am also dismayed sometimes when I see television clips of what I call some misguided youth of America. Some of the Woodstock set who march on Seabrook, New Hampshire, the nuclear power site, and they will drive 1,000 miles in a van that gets four miles per gallon. Where are our values?

One thing we can do is to revitalize our building stock. This, too, will take time but the numbers are enormous in the States. In 1977, the Bonneville Power Administration looked at three so-called strategies. Bonneville Power projected it would need an additional capacity of 2 billion kilowatt hours a year. Strategy one: reinsulate and retrofit 200,000 houses. Give them away. Cost: $137,000,000. Strategy two: a third of a conventional generating plant would do it for them. Cost: two times as much. A third of a new plant would do it. Cost: three times as much. I was out to Bonneville just this past July. They are still fooling around with this whole concept. They are looking at the cost of retrofit in terms of saving generating requirements, at 7.7 a kilowatt hour in an area that now pays 2 a kilowatt hour. To that end, their economics come out that we are supposed to put R100 in the ceiling or something like that. The only problem is, they are basing their economics on 7.7 — call it 8 to people who are paying 2 right now so we have a thing called negative cash flow for the person who does it. Its a serious business and the numbers are huge.

I had the opportunity to testify to the Joint Economic Committee of the Senate about two or three years ago, when we had a Kennedy-supported bill coming up. The Bill called for a grant, taxable, to home owners, of $750.00 for purposes of retrofit. At the same time, the congress was looking at the synthetic fuel bill. The synthetic fuel bill had an $88 billion dollar price tag on it. The Kennedy bill had a 25 billion dollar limit. I did some figuring out. I did, with the NHB, a study for weatherization of low income housing. We could take the data we had then and extrapolate it out for single family detached homes only. We came to the conclusion that some 27 million homes could fall under the Kennedy amendment and it would cost the public treasury 15 billion dollars initially and over the period. But the energy savings over the framework of the synthetic fuel time were such that what we were doing is conserving, in a time frame 1980 to 1990, energy at the equivalent of $9 per barrel and by 1995, at $4 per barrel. Once we do it, it silently works for us year after year. We don't have tore fill the gas tank. The silent servants are the energy services.

I was asked by the Canadian contractors to come up here last year and they said, since you are a key-noter speaker, come up with a catchy title. So I came up with 81 ways in 1981 and started a research project as to what contractors and the small entrepreneurs were doing in energy conservation in new and old buildings. I found 81 techniques. In a survey I did of contractors, I found that plus those techniques, when you put together all the things they could be doing and the markets they could be doing it in, I came up with 392 that they hadn't touched so the opportunity is enormous.

The key to the whole thing is learning in practice. I remember the out-of-towner who came into New York and here was this cool dude walking down the street and the out-of-towner said 'Pardon me, young man, how do I get to Carnegie Hall?' The cool cat says 'practice, man, practice, that's how you get there'. The key is the learning. Take it by steps. Limit what you are doing to what you know. Expand slowly. Don't diversify to the degree where you are in the railroad business. Be in the transportation business. We are our own worst enemies until we recognize the vital role we can play and the implication two decades, two generations down the line. Go to it. The specifics will be in the proceedings.

Michael Dennis:
Executive Vice President of Olympia & York Developments, the largest development company in the world. Olympia and York is based in Toronto and, at the time of the forum, was approved as the key developer of a major project Battery Park which will transform a huge area of New York City.

It's a fairly bold topic, the future directions of housing in our country. Let me first say that I have been away from housing for the last several years. I have been focusing most of my time in the United States, in New York and in California and therefore my comments are those of a bemused spectator and also not those of the organization with which I am presently attached. We have come away from 10 or 15 years of fairly roaring growth in housing and urban development in this country. We produced new housing at a level roughly double the level of starts of our neighbours to the south. We have been concerned about channelling growth, about equity in the housing system, about housing affordability.

Today, the issues are seen differently. The paramount issues are inflation, interest rates, how people are going to be able to hold on to what they have and, as a result, we focus lot more on retrofit, rehabilitation, conservation, holding down energy prices. From the perspective of both the consumer and of the industry, interest rates are the key factor. No new rental housing is being produced.

Two years ago, when interest rates passed the 11.5 percent, people stopped building new rental housing. Even then, they could only do it with variable interest rates and other mortgage gimmicks. The gap has worsened by the gap between the cost of producing a new rental unit and the rent that one can achieve is worsened by the presence of controls. The result is that we are getting across this country, particularly in high growth rate areas, but even in ones where the demographics don't produce as much demand, very, very tight rental housing markets and even if rates come down, none of us are expecting 10 or 11 percent money again for some time. That's going to mean limited mobility and it's going to mean a much tighter situation than we have been used to in the past.

Similarly in the ownership market, high interest rates are dissuading people from buying. They are making it impossible for people to sell units that they are holding on to. At a conference held two weeks ago, the Federal Minister of Housing presented clearly the big issue that people were concerned with, how were people facing mortgage renewals going to be able to hold on to their houses? That's affecting buyer confidence.

Mr. Lapping said the big question demographically for the next decade was going to be what would people who already owned a house, second and third time purchasers be doing if rates stay the way they are? It's very clear what they are going to be doing; staying put, fixing up their houses.

The commercial sector has, until recently, looked stronger than the residential. That's a continental phenomenom. Inflation and tight markets have led to substantially higher interest rates. A recovery from the over-building of the early 1970s has led again, across the country, to dramatic amounts of new office development. That may now be slowing down as the market begins to get saturated, as we look at a recession induced by high interest rates. Looking at the problem from the perspective of a major commercial office developer, the major problem is finding new sites. Our cities are becoming more mature. Inflation has led to land costs being bid up quite high and it's difficult to find good sites. Very simply, King and Bay is built out and so one has to look on the margin and again with high interest rates and no certainty as to where permanent financing will be available, if at all, private developers are cautious. That means if one of your topics is revitalizing downtowns and if you are going to rely on the private sector to come in and do that work, the question of what the cost of money would be is again paramount.

The key question is whether we are just looking at a snapshot in time? We've been through the cycle before. Housing in particular. Slow the economy down, tight money. It may be that we are just looking at a snapshot. If we are not, or even if we see some relief but interest rates go down to 15 or 16 percent, that's going to mean a very different kind of urban environment than we've looked at the past. It's going to mean more limited mobility. It's going to mean people refusing to move across the country to take a new job because they can't buy a new house. It's going to mean a diminished sense of prosperity. It's going to mean more pressure on the existing housing stock.

That pressure is coming partly from white painters who find that housing in the centre city is cheaper. It's going to be pressure to convert existing stock to produce apartment accommodation, flats, multiple accommodation because no new rental housing is being built. It's going to mean, if rates stay high for any length in time, a shake-out in the industry and a lot of smaller producers being driven out of business and not coming back. For commercial development, as I said, it's going to mean that only the best projects in the strongest locations proceed. A limited willingness to undertake the risk of new developments until demand again builds up and we get another explosion in rents. That's the bleak picture if rates stay anywhere close to their present level.

None of us have a crystal ball. One of the economists whom I have been reading lately writes of the flight to paper money. Much of the situation that we are in today is the result of concerns about inflation, lack of confidence in paper investments, people chasing gold or houses, any hard assets, rather than being prepared to put their money out for a reasonable return. If that's changing — if the real rates of return that we are looking at today of 7 or 8 percent shrink back to a more traditional level, if the diminishing inflation that we see in energy, in food and in other prices continues, in fact, in housing prices today, as tight money forces people to drop their asking prices, then interest rates may go back down. If they do go back down, then we will return to the agenda of the '70s. That agenda was one of neighbourhood preservation, rehabilitation, attempting to convince people to return to the centre city and the inner suburbs with a substantial emphasis on infill housing, on mixed use developments, on new forms of medium density housing and on the conversion of obsolete industrial areas by public agencies.

Many of those issues were the subject of, as I recall them, fairly fierce battles. I need only remind you of holding by-laws, fights over demolition controls, efforts by the Minister's government to produce an Ontario Housing Action Program to cajole and to convince municipalities to accept cheaper and higher density housing, to battles over apartment re-zoning. I find it curious that most of those passions have cooled, that the policies that we were talking about in the early '70s have become the conventional wisdom either because they were ideas whose time has come or because market forces had produced sufficiently substantial change in demand, that the ideas that public officials were talking about became acceptable. We have had a return to the centre city in the inner suburbs, a return fostered by demographics: More childless couples, more empty nesters, people reacting to high gas prices and high car prices and lengthening travel times, to life style changes and to the maturing of our cities as they became more attractive places to live. A number of major developers have clearly reacted to those changes.

I am bemused as I travel around the city and see former suburban developers putting up condominiums along Bloor Street. We have seen condonimiums which were virtually unknown to us ten years ago become an acceptable form of tenure. We've seen very substantial demands for the kinds of uses that planners were advocating ten years ago, diverse, mixed use developments in the centre of our cities and willingness of people to move into new neighbourhoods like St. Lawrence, like False Creek in major Canadian cities. One of the things that is becoming dramatically clear to me is the willingness of private developers, the biggest private developers such as Olympia & York, Cadillac, Campeau, to respond to public initiatives, to develop on land publicly assembled in the centre cities, land, much of which was assembled 20 years ago or 10 years ago on sites which were then marginal and sites whose time has now come.

The Minister mentioned that I was going down to sign the Battery Park deal today. That's 100 acres of land fill that sits on the western edge of Manhattan that until very recently the public corporation which had assembled it could do nothing with. What's happened now is that sites are so difficult to obtain in Manhattan and the price is so high that people are prepared to look slightly off the beaten path because the benefits of taking that kind of risk outweigh the difficulties of assembling meaningful sites in the downtown. We are doing a similar project in San Francisco. The south side of Market Street, wrong side of the tracks 10 years ago but the downtown is mature and as a result a company which formerly specialized only in downtown office buildings and always looked for the site at King and Bay is prepared to take that kind of risk and is prepared to develop a 4.5 million square foot project which is a mix of hotel, residential, entertainment and office uses in a way in which we would not have before. While I've said to you that we are looking at a more restrained level of growth and that interest rates will be the crucial factor in the coming decade, it is very clear to me that private developers see the challenge of the market, see the challenge of moving back to the centre city, back to the inner suburbs. They want to do it, are prepared to carry out what I call the agenda of the '70s that was the subject of so much debate even six or seven years ago. The question is whether the economic climate will permit them to do so.

Section A

HOUSING RENOVATION

1 Planning For The Renewal Of Existing Housing Stock

Ray Spaxman:
Director of Planning for the City of Vancouver, Mr. Spaxman was formerly a planner in Britain and in the City of Toronto.

We, as a city, are just over 400,000 population and we exist in a region of somewhat over 1,000,000. In the city, we have about 160,000 dwelling units. It's interesting to wonder what they are because it compares I think differently from other cities. Half of those units are in single family dwellings. The other half are in apartments and there's a very tiny component of what might be called row housing or town housing. It's not a form that people in the west are used to. We don't have lovely old rows of brick housing anywhere. The majority of development, including modern development in housing, is three four storey wood frame and, of course, half the city is covered with one and two storey single family wood houses so when you move out there as I did eight years ago, I was surprised to find a whole city developed in what looked to me like seaside cottages. I must say that I've changed to love and enjoy the moss and the ferns and the lusciousness and the temperate climate and can certainly live with the idea of frame buildings but is is different, particularly when you are trying to preserve something which, when you go and kick it underneath, sort of collapses into dust.

The current vacancy rate and rental housing supply is about zero. That's as close as you get and if you are looking for rental places, you certainly feel it. The housing situation is clearly very severe for the low income and, in the context of what government does about it, it makes it doubly severe with a province that really doesn't take very much of an attitude toward affordable housing as I think Ontario does. It makes it doubly difficult to provide for that although we are of course much more of a free enterprizing community out west.

The thing about our city is that we do have some older apartments and they are being replaced by new apartments. We found that one way around the rental controls is to redevelop, to get into condominium development, to tear down old buildings with affordable housing and replace them with brand new ones sometimes with significantly less units in them, all at a much higher price of course.

In the single family zoned areas, where suites are not permitted, in the basement and upstairs and downstairs, we estimate there's something like 15 to 20 thousand illegal suites that exist. I find it very intriguing, as the Director of Planning who of course administers the zoning by-law in Vancouver, to be shown lots of mortgage helpers which I am told the authorities don't know about. In addition, there are some 7,000 more units which have been permitted over time.

There is another theme that I think may be more common to lots of cities which we find intriguing in the dilemmas we have to sort out which come from the conservation and rehabilitation programs of the '70s. The Neighbourhood Improvement program has been coming to a close now in Vancouver. We've spent $13 million in the Neighbourhood Improvement Program in the city and, in addition to that, of course, we've been in the residential rehabilitation assistance program spending many millions of dollars in that area too. Since the '70s.

Vancouver has enacted a large number of zoning by-law changes to assist the renewal of certain of the older residential areas of town. By-laws are enacted after substantial planning work with communities aimed at preserving and enhancing the existing valuable characteristics of the place. These new zoning by-laws reward the retention and deduction of older houses through additions and infilling so that higher densities can be obtained by retention addition than by total renewal through redevelopment. That means that more floor space and more units can be obtained this way than demolishing and re-developing.

Urban design guidelines have been produced throughout the city to emphasize the enhancement of the character of the neighbourhood as well as the individual structures. Even recently, in the mammothly developed areas like the highrise west end — now accomodating close to 40,000 people — new zoning by-laws emphasised the enhancement of the public domain; that's the streets and the parks and the fair sharing of sunlight, daylight, privacy, bearing in mind that the vast majority of all houses in Vancouver have a view, sharing of the view.

It's interesting that, in Vancouver, the view was only discovered in the last ten years. The house builders in the 30's seemed to believe that it was more important to face the street than the view so rehabilitation has also been spurred in many of the single family areas as people tear out bathrooms and put them at the front and put the livingrooms at the back and put in large windows. The next thing will be to get rid of the hydro lines which hang also in the rear lanes.

We do have our list of heritage structures but, beyond the list, of course, are hundreds of beautiful old and I apologize for the use of that word, "old," houses. We enacted zoning changes two years ago to give the Director of Planning the discretion to vary the zoning by-law requirements where it could be determined that the owner would like to keep his building, where the heritage committee thought it was worth saving, that it wasn't particularly listable and where relaxations were needed in order to preserve the building. We can now relax height, side yards, density and number of units, in any are of town where it is believed that an old structure which hasn't actually been listed is worth preserving.

Another thing to record, of course, is the public attitude to all this because it's the public attitide that actually generates and enables anybody to do anything about what you might conceive to be a problem. The tradition of single family housing in Vancouver, has led to strong opposition to altering those neighbourhoods. In the '50s and '60s, to add to that, there was a massive reaction against large scale redevelopment and high rises and the rise in the lobby of the enviromentalists and the opposition to the general concept of growth for growth's sake which occurred in that time. They reversed the growth trend.

Last year, the city, through the city planning commission, conducted an extensive survey in order to try and establish what the public viewpoint was about a whole range of factors including the natural setting, the people of the city, the different parts of the city, economy, leisure, movement and services of property. With regard to housing, the goals that emerged stressed variety of housing but showed a clear split right down the middle between those who believed that multiple housing forms should be permitted and those who thought no, they must be restricted to those special areas where they exist at the present time. Most respondents stressed the importance of energy conservation and the majority stressed the importance of heritage preservation. It appears today, because of the growing appreciation of increasing hardship in housing, public attitudes in Vancouver may be changing toward supporting higher density development to meet the residential needs.

The status, as of 1981, in these areas seem to be as follows; most of the areas zoned for high density housing redevelopment have been used up. Developers are pushing outward looking for new redevelopment areas but the adjacent areas consist of the recently stabilized lower density neighbourhoods. Here, like a girdle around the central city, the public attitudes are supportive of the status quo rather than change. Beyond those areas and the expanses of the rich single family housing, there is strong emotional reaction against the idea of redevelopment to higher density townhouse, rowhouse or other multiple housing forms. This is a virtually fully developed city.

So what else are we doing? Well, take the legalizing suites. On one hand, in terms of legalizing the suites, some people see this as a significant opportunity. They claim that if we legalize suites in our single family areas, not only will the illegal ones become compatible with the law but new ones would be created thus providing many more affordable units giving owners an increase to pay their mortgage more easily and further upgrade their community. On the other hand, some people believe this would mean the total destruction of the single family community in Vancouver and reduction in the standard of upkeep in effected neighbourhoods because there would be more renters, more cars, more traffic. Some argue that you would have firetraps or those without adequate space of plumbing and most of these, rather than accept the cost of remedying these difficiencies, would, in fact, remain illegal. Others fear that further red tape and bureaucracy would be needed to control all of these things.

What we are doing about infill? While infill is encouraged, in our medium density in residential parts of the city, it's not yet generally applicable across the city. However, in our most exclusive area there's a softening in that attitude to the single family status brought on by economic woes including an assessment rate related to the so-called value of housing in the last year or so. This is a district of about 350 acres mainly built in the early century, of large fine mansions. The plan, combining goals of heritage economics, renewal, and family accommodation, aims at preserving the very special prestigious character of the neighbourhood by allowing conversions, additions and infilling within very special guidelines.

We worked with the neighbours on this planning study. They were some of the most astute lawyers in town and dentists and other well to do people.

A maximum number and type of conversion units will be allowed in the larger mansions so as not to destroy the essential single family characteristics and the grand architecture. Infill of the nature of coach houses will be permitted where site and character permits. While, in total, the additional units created will not add significantly to the stock of housing in the city, they will certainly add enough incentive to rejuvenate an area which otherwise was getting seedy and was going down. It is always important if the leaders in the community show an example of accepting the infill and townhousing which may well happen in this particular area.

On backyard housing, we haven't gone very far even though Vancouver has a unique situation, I believe, in that practically every block in the city has a rear lane. As a consequence of that, with 120 foot deep lots and a 20 foot lane in between, with just garbage along the back and falling down garages, there's a very good opportunity to put in backyard housing.

However, there's another snag that we've all got to learn to invent a solution for which has to do with rip-off block busting, carving out profits. If we can find in the city an appropriate entrepreneur who would work with the neighbourhoods and work with the city to find a reasonable way of moving into a neighbourhood without block-busting it, without running it down, without deliberately moving tenants in, without having all the seedy problems that we remember from the sixties as large scale redevelopment occurs, then maybe, somewhere in the future, we may be able to move toward infill backyard housing. The same thing can be said about townhousing which is heavily frowned upon in the city.

We had a public hearing last week for a very small site between roads but next to a high class residential area and, because it was called townhousing, the neighbourhood turned out to fight it. The thing narrowly squeezed through. In previous years, it wouldn't have gone through at all. It got through on a five to four vote and whether that augers well or badly I don't know. The neighbourhood generally wasn't very pleased about it.

I should say something about housing levies and requiring housing development with office development. As you know, Vancouver is really growing very fast in the downtown at the present time with a take-up of one million square feet per annum which we've never hit before in the city. Because of the housing difficulty and in the context of the regional goals, it's very important we ensure there is a balance of housing being provided in the central areas. Council is currently considering the possibility of requiring housing development at the same time as office development so you'd only get your permit for offices if you also provided housing. Failing that, there would be a requirement for you to pay into a social housing levy. If you wouldn't do it, then council would to it. There's a lot of debate and argument going on with the heavy opponents drawn up in the debate. One of the weakening elements against requirement of levies is the fact that our free enterprise neighbour to the south, San Fransisco of course, has just enacted by-laws like that which puzzled the conservatives heavily.

In the last few weeks, council has actually enacted a by-law to prevent the demolition of any rental housing until such time as the developer has in his hand his very last building permit to prove that he intends to do and virtually can start next week.

The tight housing market in Vancouver has led, in the last two years, to an increase in the number of plans to convert old warehouses to housing. These are mostly taking the form of more expensive studio suites and will, for a long time, only cater to a special group of people who like downtown and living in special quarters.

While there has been an increase in the number of mixed housing and commercial development in the central area, developers and the provincial government recently have been pressing for more encouragement for developing housing on what they see as wastelands and on the flat roofs of many of our strip commercial areas. A lot of pressure therefore is coming from those two sectors to relax zoning requirements. They would like a lot more density and perhaps that's going to be possible to develop. In Vancouver, we have lots of single storey shopping areas along major highways. It's going to be possible to develop, perhaps, on top of those.

On energy, I have to admit that, while the sun doesn't shine quite as much in Vancouver as it does here, it's a darn sight more temperate. While we have some experimental sonar — solar-oriented office, apartment and housing development — and we have some good civic policies relating to that area of conservation, mainly adopted from Portland Oregon, we have had little real action at this time.

Just to wind up with a few summarizing comments. I think Vancouver's needs are different from other places in a number of respects. Its public and its government seem to have different attitudes to growth and who should provide for housing. Vancouver has changed its zoning and its direction to try to tackle its problems and continues to do so. The 1980s, moving to the end of the century, will see a young city being forced to alter its values and its structures and services in order to accommodate the continuing rapid growth which we can expect to occur. While there are many ideas abroad which I've tried to describe to you, they are not policies yet. The next few years are crucial for our community to convert these ideas into actions.

Guy Legault:

Director of the Restoration of Dwellings Department, Montreal, he is an architect and former President of the Montreal Municipal Housing Society and a former member of the National Capital Commission.

I am going to talk about the implementation of a local municipally and spirited program to promote the restoration of existing housing stock in order to stop its deterioration and reverse the movement. The city of Montreal counts 450,000 units, 150,000 of which were built before the last war. Buildings of 300 years, mind you, are quite a few. But still housing stock of 80 years old is quite important to look at to stop deterioration. 80 percent of households in Montreal have tenants. The density in ancient neighbourhoods could reach, in large areas, 60 units per net acre. Rents are relatively low in comparison to other cities in Canada.

As early as 1965, the city of Montreal petitioned the provincial government for permission to amend its charter with a view to being empowered to establish, under terms of a by-law, a housing code setting standards for occupancy and maintenance of residential buildings located within its territory. At the same time, it sought permission to grant subsidies for the rehabilitation of housing units.

In 1967, as soon as the act creating the Quebec Housing corporation was adopted, the city set up its own housing department and directed it, among other things, to apply the housing code toward the subsidies. In 1973, except in those particular zones recognized by the Quebec Housing Corporation, the city carried a loan, the financial burden resulting from the implication of the housing code and the cost of subsidies awarded. Since January 1, 1973, the Quebec Housing Corporation has supported financially the municipal restoration program. It shared the cost of subsidies up to a maximum amount to be explained in detail further on and shoulders part of the relevant administrative expense.

The National Housing Act having been amended, the Canada Mortgage and Housing Corporation created it's own residential rehabilitation assistance program — RRAP — available since June, 1975, in the case of Montreal. This new formal assistance compliments the help offered jointly by the city and the Quebec Housing Corporation.

Unitl now, all these programs, the original municipal programs and the joint provincial-municipal ones and finally the federal-provincial-municipal have been administered and implemented by the city acting on its own behalf or at the exclusive delivery agent. As a consequence of this there are more than 10,000 housing units which have been restored with the help of the subsidy, in Montreal, while more than 30,000 have been brought in line with the housing code requirements without the benefit of any subsidy.

The main feature of the municipal program could be defined as simplicity and continuity. The program has always proceeded from the basic principle that housing was to be brought in line with the housing code requirements; the amount of the subsidy provided has always been proportionate to the financial effort of the owner involved. While basic criteria and principles have remained the same over the years, the program has adjusted to current realities and needs. Many amendments were made to the housing code with a view to increasing its flexibility and extending it in relation to the technicial difficulties encountered. Moreover, subsidies rose successively from 25 to 40 to 50 percent of the admissible restoration work cost so that today 50 percent of the costs are covered to a maximum of $12,000 per dwelling unit.

The program extends to all buildings located within the territory of the city and not just to those in designated areas. Quite naturally, monetary constraints make it necessary to determine a number of territorial priorities and a degree of distribution as will be seen further on but there is no provison to exclude or to pay exclusive attention to any specific areas.

In Montreal, the great majority of buildings to be restored with the help of a subsidy are made up generally of three to four dwellings owned by one person which means that the average or typical owner operates on a very small scale and knows little, if anything at all, about buildings and restoration techniques. For this reason, the city provides in each case, a work schedule which serves as basic specification. With this information, it becomes much easier for the property owner to determine or obtain work costs estimates. Moreover, the city offers the services of its housing clinic to those who request such assistance. It will provide most useful advice to a building owner faced with a particularly complex problem whether with the structure or framework of the building, the need to redesign certain non-functional dwellings or the wish to perserve architecturally valuable features or with other difficulties.

In addition to the city which initiated this program, the Quebec Housing Corporation supports the program financially. However, this participation is not a source of any difficulty for the applicant since, up to now, the provincial and municipal programs are one and the same program. The Quebec Housing Corporation therefore subsidized the municipal program on a basis of 12.5 percent of the cost of restoration established by the amount of money spent for the rehabilitation of buildings. The amount of money should not exceed, in the case of the province, $1,250.00. The Canada Mortgage and Housing Corporation program does not, in any way, take the place of the municipal or provincial program but rather compliments it.

It should be mentioned here, that, at lease in the case of Montreal, the city administers the program on behalf of the federal government. This means any citizen applying for existing subsidies does not have to knock at several doors but just at one — the city's — thus the risk of duplication is consideraly reduced as is the amount of red tape involved.

The federal financing contribution takes the form of an interest free loan, the repayment of which may be forgiven providing the owner agrees to the rent as set out in the agreement and does not sell his property for a given period of time without the prior authorization of the Canada Mortgage and Housing Corporation. The maximum set for this loan is $2,500.00 per dwelling. Consequently, the city offers subsidy of $12,000 maximum per dwelling. The participation of Quebec Housing Society not exceeding $1,250.00 and CMHC — $2,500.

In Montreal there is just one address where applications for a subsidy may be submitted. In order to qualify for subsidies, an individual must own a residential building that does not meet the standards set out in the housing code and that will cost at least $4,000 per unit to be restored. In certain areas of the city, this minimum may be brought down to $3,500. When submitting an application for a subsidy, the property owner must provide the documents including proof of ownership, and valid power of attorney where the person is acting on behalf of the owner, where applicable a building survey, a copy of the restoration plan and a work cost estimate. Obviously all the above documents need not be submitted at the exact moment that the application is filled but they must have been filled before any recommendation is sent for approval of the subsidy by the executive committee of the city.

Within a few days after the application is received, a first inspection of the premises is made in order to determine what priority to assign this building. The owner is then told whether his application is eligible and within what period of time he should expect to be dealt with. The next step involves a second visit of the premises by the inspector in charge of the case in order to list the various violations of the housing code and to make it possible for the technologist to draft a work schedule to be submitted to the owner and to discuss with him if necessary so the owner or agent can contract a contractor or subcontractors of his choice to obtain a cost estimate for this work. When this estimate is ready, it is submitted to the technologist for analysis, consideration and eventual approval. It is at that particular moment that an affirmative recommendation is sent on one hand to the municipal administration and to the Quebec Housing Corporation insofar as their respective share of the subsidies concerned and on the other hand, to the Canada Mortgage and Housing Corporation. In the case of a recommendation submitted to the City of Montreal, a copy of which is sent to the Quebec Housing Corporation, approval is automatic. The Canada Mortgage and Housing Corporation however, reserves the right to approve or reject recommendations made by its representative and to proceed with an analysis and evaluation of the case on the basis of its own criteria. In all fairness, it should be stated that very few cases have been rejected by CMHC after having been initially approved by Montreal.

Once the subsidy has been granted, an effort will be made to ensure that the owner has demonstrated financial ability to carry out the non-subsidized part of the work and to obtain necessary permits after which the city technologist will follow up to check that the work is performed in accordance with the standards of quality and conformity set by law and also to draft their reports which the city and the CMHC must have in order to release city funds as the work progresses.

Finally, once the work has been completed actual costs and estimates are prepared. If in order, an additional subsidy may be granted where the amount of the original subsidy was lower than that authorized under the terms applicable by laws.

Human and budgetary constraints prevents the processing of all subsidy applications withing reasonable time limits. For that reason, a number of priorities have to be determined. These will have been brought to the attention of all applicants first. There are territorial priorities needed to be stressed that the city is free to designate in those areas where it wishes to concentrate its effort in order to revitalize a particular neighbourhood. While these areas do not benefit from an exclusive effort, they do constitute priority areas. Then there are priorities related to the state of repair of buildings. For instance, attention will be given first to those buildings so dilapidated they jeopardize the health or safety of their occupants or the neighbourhood and, for obvious reasons, priority will also be given to vacant and/or boarded-up structures which are a constant fire hazard and a permanent attraction for vandalism.

When a building is not restorable, the city may provide for a subsidy related to the demolition of the old building in view of the construction of a new building. The subsidy is equal to the amount of municipal assessment of the building when it is demolished.

In addition to housing restoration subsidy, the city provides substantial financial assistance to any endeavour lending to the demolition of rundown sheds and other accessory structures as well as to the improvement of backyards. This program, called "Operation Sunflower" was given greater scope than ever in 1980. Up to know, it has resulted in the tearing down of more than 9,000 rundown accessory structures. Just in 1980, close to 3,500 sheds were eliminated thanks to this program.

A maximum of $3,500 is set for each subsidy which covers not only the cost of tearing down dilapidated structures but also that of improvement work required as a result of the demolition carried out. It hardly needs to be pointed out that these subsidies, more often than not, have provided that extra little push property owners have needed to proceed with the restoration of the housing units to which the rundown structures were attached.

In 1980, the provincial government shared, for one year only, the cost of the $4 million program. Since 1970, the city remained the only agency responsible for financing the program. In 1981, the 1/2 million dollar budget operation "Sunflower" was extended in landscaping of 17 back lanes where the city spent an extra $3 million, not only on the lanes themselves but on the backyards of private buildings, whenever the owners were willing to accept the city's free offer. In 1982, the extended program will touch 22 more lanes.

This type of specific action is believed to act as a demonstration of how the quality of the enviroment can be improved in spaces too often considered as dilapidated forever.

The city has extended the scope of its program providing for restoration subsidies in an effort designed to promote the creation of new housing units; it now provides subsidies for the alteration of non-residential buildings, warehouses, vacant facilities, commercial buildings, schools, to make them suitable for housing occupancies providing such buildings stand in zones where housing is permitted. Such subsidies, as in the case of those provided for restoration activities, make up to a maximum of $12,000 for each new housing unit that's made available.

Up to now the city has borne alone the cost of these subsidies except where the work was undertaken by a non-profit corporation or housing co-operatives which are eligible for provincial and federal program benefits.

In conclusion, it is essential to stress no matter what direction programs designated to promote the preservation and improvement of residential stock of any city take, if they are to achieve results they must rest always on the following criteria: they must be simple and readily accessible to those wishing to avail themselves of their benefits. They must be permanent thus guaranteeing their public credibility. They must provide for clearly stated priorities, fully explained to all interested parties, and they must be managed by the body closest to the user and most familiar with the latter's problem, namely the municipality.

Bruce Davidson:
Commissioner of Planning of the City of North York since 1976.

You are looking at the gentlemen who is the Commissioner of Planning for the youngest municipality in Canada, not only in Metropolitan Toronto, but in Canada. We are about two and a half years old now. We are the fourth largest municipality in Canada by population and we had our birthday last February. We have another one coming up and it happens to be on a day in February that is consistent with hearts and flowers and we call ourselves the City with the Heart.

Looking at our zoning by-laws and official plans, you wouldn't know that but we are supposed to be the City with the Heart. Renewal of existing housing stock in a suburban municipality like North York, because we are such a new municipality, really growing up in the '50s and '60s is a little different affair than with Vancouver which talks about being a "young municipality" and with the City of Toronto, which is a supposedly an old municipality, or Montreal or Quebec. The City of North York is a mature suburban municipality which has passed through the stage of rapid growth and is now entering the period of housing renewal. The city is now 90 percent developed and land for new housing is virtually exhausted. At the same time, demographic changes are altering the population which must, in the present and in the future, be housed.

The total population of North York has remained fairly constant through the 1970's at approximately 563,000 people. Although an average of 2,100 housing units have been added annually to the city, these new housing units have not contained the number of people to significantly have increased the population within the City of North York. The birthrate in Ontario has remained low for some time now and this is reflected in the population of the city which is continuing in an aging process which began in the mid-60's. Each year, the older age groups make up a larger percentage of the total population for the city.

At the same time as the population is aging, household structures are changing rapidly. In 1976, non-traditional households, that is households of single parents, one person, spouses without children at home, non-related persons, comprised over 60 percent of the households within the city. This percentage rate is expected to increase in the future. Current social and economic trends will require changes in North York's housing profile. Non-traditional households are increasing while much of the housing was designed and built for what we consider to be the traditonal family within our suburban structure. Many persons are now inappropriately housed in units which do not meet their needs, desires or possible income restraints. This would include persons housed both in ground level accommodation and in apartments.

Some renewal of existing housing stock in North York has been triggered by the age of housing, high interest rates and the high cost of construction not only in new construction but add-on and addition-to. Rather than moving to more expensively mortgaged accomodations or dwellings, many residents are making improvements to their present accomodation. Most of the residential building permits issued in the past year have been for alterations, additions and replacements of existing units, particularly single detached dwellings. However, this limited housing renewal is not of much benefit to the non-traditional households I have mentioned previously.

Now, remember this is where the demographic changes are taking place, in the non-traditional housing groups. The cost of buying and living in a ground level dwelling is becoming prohibitive to families of average income and to most non-traditional households. The high standards of our zoning by-law have provided a basis in law for maintaining the stable family nature of neighbourhoods. These standards are part of a suburban tradition and have been reinforced in the political arena. The assumption that the detached and semi-detached dwellings of North York should exclusively house traditional families is no longer valid at this point in our development or probably in an municipality's development in North America. This in effect asks many people to pay for something they cannot afford or find unsatisfactory in housing accommodation.

Today's economic climate is hazardous, to say the least, for future home buyers. As noted by the federal government's latest statistics, some 100,000 families will lose their homes in the spring 1982. This, combined with the rental vacancy rate of 0.7 percent places the six municipalities within metropolitan Toronto, the two cities and the four boroughs, directly in the fore of the housing crises.

Traditionally, as planners, we have held to the purest concepts of attitudes of the '50s and '60s which recognize the good times of massive, reasonably pricedhousing projects in single family form. These were for us the glory days of winding streets, wide boulevards, shopping centres and no tenants except in high rise buildings. The zoning by-laws and the official plans aided us in our dream of the suburban community where every homeowner was between 25 and 40 with 2.5 children, where no one would grow old or unemployed or be single or rent. Alas, times and those 2.5 children are upon us and we haven't aged or matured. Nor have our planning principles maintained the status that our population has maintained. We still see our suburban communities generating the people we foresaw in the '50s and '60s.

Being the planners for the largest surburban city in Canada, we have seen our municipality change before our very eyes. We have, over the past five years, attempted to draft legislation which matches today's lifestyles and economic conditions, perhaps bringing planning with the city of North York into the '80s. The Canadian dream, which included ownership of a family-sized home on its own lot, appeared achievable in the affluent '50s and '60s for a large proportion of families and individuals. Such a home was expected to have a large amount of living space including at least three bedrooms, a living room, dining room, kitchen, garage and full services with a basement. The formation of a family in the '60s and '70s usually included young people living in their parents homes until schooling was finished, then obtaining employment and moving out of the family home, getting married and renting an apartment, having children and buying a house to live in until death or moving back into an apartment after the childred have left home. The purchase of a house however, may turn out to be more a dream than achievable objective for families in the '80s.

The cost to purchase and operate a home of average cost in North York in March of 1980, was 47 percent of the gross income of the average family, making it nearly impossible for a family of average income to have one wage earner and own a home in North York unless significant assistance is available from some source other than earned income. Rental of an average three bedroom apartment would require 17 percent of gross income for a family of average income. There's a shortage of all rental apartments in North York with limited potential for new units to be built; the proper structural duplexing of larger houses is an attractive way of obtaining more housing units at a low cost. Family sized ownership homes are available in adequate numbers in North York but at such cost that preclude purchase by a significant proportion of residents. When I'm talking about duplexing, I'm talking about allowing an individual to take his home and put in a basement apartment or an upstairs apartment. Legal duplexing is a legal term that we have to use within the planning structures of the city and the province.

To permit duplexing of houses to help aleviate the shortage of affordable ground oriented accomodation, the current zoning by-laws should be amended. Regulations would have to be formulated to ensure that such legal duplexing meets acceptable community standards. That's the big question. We are getting a lot of difficulty from people who live within our municipality to the staging of legal duplexing on the basis that, in fact, we are ruining their neighbourhood. We are creating a situation that is not the status quo. We are trying to change things within our city that are not the existing standards or the community standards within our municipality.

At present, homeowners cannot structurally separate a house into a legal duplex and are therefore denied the choice of assistance with mortgage and energy cost through the income of rent payments. Many young families in the older municipalities such as Toronto and Halifax, employ legal duplexing as a stepping stone to owning and occupying their entire house as their families grow older. Our citizens are denied that choice of legal duplexing and the financial assistance with home ownership costs on a fixed income. High density housing appears to satisfy the basic housing needs of the increasing proportion of households in North York that do not have children. It does, however, present limited choice in terms of style of housing. The basic needs of single parent families are more difficult to meet at an affordable cost. The housing needs of the traditional household consisting of husband, wife and children can be met by the large amount of low density housing presently available in North York but the costs may deny such housing to the most untraditional families.

Since North York is situated in an urban area six times its population, it is unrealistic to seek to house all the households forming in this municipality. In a large urban area, such as the greater Toronto area, the wage earners of new households may obtain their employment at a location inconvenient to a home in North York or may develop a particular preference to live in some other part of the urban region.

It would be undesirable however if all new households, whose members had grown up in North York, could afford a family sized home by moving 20 or 30 miles outside the metropolitan Toronto area. It is not realistic that every newly married couple should expect to be able to live in a new detached house immediately upon marriage but it would be a positive step if such a couple could afford to buy an average home suitable for raising children after saving a substantial down payment. The fact is that the construction of dwelling units is continuing but the population has reached the stable level because of constantly falling occupancy rates. School enrollment has dropped off dramatically, suggesting that the majority of families who are still rearing children, are not locating in our city or, for that matter, within Metropolitan Toronto. It appears that families with children are locating in the suburbs such as Pickering, Aurora, Brantford, Mississauga and Newmarket and so on. They are locating in these particular municipalities because the initial cost of the home is such that a wage earner of average means can much more ably support a family in his own home. High transportation and operating costs may be encountered in these other suburbs and they are expected to partially offset some of the capital cost savings.

Approximately 44 percent of the existing housing stock in North York is comprised of single, detached and semi-detached dwellings. These units provide a potential for housing renewal in the form of duplexes. The forthcoming second part of our housing policy background report will explore proposals to permit legal duplexing in a wide range of residential zones. The Ontario Building Code, fire regulations, property standards and parking needs will have to be considered for amendments to zoning by-law to allow for the legal duplexing to take place.

Another use which would serve the housing needs of non-traditional households is that of a boarding house. Our forthcoming housing report will also make recommendations respecting amendments to permit boarding houses in residential zones. It may be possible to cut the cost of housing by the adoption of policies and by-law amendments permitting small lots, smaller, better designed and more space efficient houses, more flexible positioning of homes of lots and cutting of some of the high standards of engineering services. Only if the municipality passes by-laws setting a maximum house size, will smaller houses be achieved.

There will also be a trend towards more intense development in the future as redevelopment occurs throughout the city. One of the major things happening in North York is that we are going through the redevelopment process even though we are a city only 20 years old. It has been recommended that our new housing policy contain development criteria for considering amendments to the zoning by-law when new residential uses are proposed or increases to the existing residential density considered. In addition, the proposed housing policy provides for the designation of residential development or rehabilitation areas where major planning efforts may be required to upgrade and conserve specific residential areas. Duplexing, boarding houses, smaller houses and more intense development are the methods we have available to deal with housing and energy costs which are expected to increase into the future. The biggest stumbling block is, of course, the political trend on the part of the politicians and ratepayers associations to maintain the status quo in suburban single family neighbourhoods.

As a planning exercise, I see the mistakes of the '60s continuing in the new suburban communities outside Metropolitan Toronto which are dominated by single, detached sub-divisions. Energy costs for heating and transportation will undoubtedly slow the trends towards this ex-urban development.

In conclusion, North York's proposed housing policy recognizes that the maturing of our housing stock will increasingly necessitate a policy for rehabilitation, renewal and redevelopment. Policies will be reflected in amendments to our zoning by-law; our basic goal is to ensure that adequate housing is available to suit the needs and desires of our population and therefore North York will continue to provide a diverse mixture of residential densities in the future.

Stephen McLaughlin:
Commissioner of Planning and Development of the City of Toronto. Mr. McLaughlin is an architect who previously headed his own firm.

Anything or any organic thing that gets old must renew or die. In the city, we have had three ways of dealing with that kind of renewal of organisms; one is by government programs, the NIPs, the RRAPs, the OHRPS, the CSCPs and the ONIPs, etc. The second approach we've tried is by by-laws; minimum maintenance by-laws, these kinds of things. The third approach which seems to work best is by doing nothing at all. Those parts of town seem to have done well.

There are a series of what I would call, unintentional results or accidents from our interventions. I guess if you look back in the last ten years you watch what I would call a very unholy alliance between the rich and the poor in Toronto as to what renovation and what renewal is all about. The rich in North Toronto said, 'protect our property,' and the poor in downtown said, 'protect our life,' and somehow, between the two of them, you end up with the same policy. It is only now that people have sorted that out. We've really talked much too much about buildings and much too little about folks.

Yes, we have saved Don Vale, we have saved Kensington, we have saved Cabbagetown, but for whom? Certainly not for the people who live there. There's more inexpensive housing in St. James Town than there is in Cabbagetown. That is a fact so I am not sure that's an accident, whether its conspiracy or whether it's just good planning.

Secondly, the by-laws that we put together don't work. Most by-laws were built for frontier towns. Ours are no different and they don't work at all. The Building Commissioner is in the back of the room and he told me on the way in that the reason there is more renovation going on in Toronto is because it is easier to cheat on an old building. I think that's true because, if you have a new building of course everyone knows that you have a new building and you must get a building permit and a development application under re-zoning and the committee of adjustment and an official plan amendment. But if it's an old building, it takes at least three years before people find out that you've actually done something.

As an example of 'by-law madness' I found our by-laws were in dispute because one part of your department said the way you measure progress is by the number of toilets in a house and the other half of the department said no, it's good for you to share toilets. This gets into my third point which is that there is a social and value judgement to every by-law and every law that one might invent.

Going back to the first point, and marrying it with my third point, neighbourhood stability means different things to different people. It means, in most cases, no new people, no additional people, no more cars, no more skidoos. We have a problem in the Annex which is a fairly wealthy part of downtown Toronto — it is very stable; it's run by the Annex Republican Army — they basically make sure that nothing happens there at all. I talked to them the other day and they were horrified. They said, 'there's someone from North York moving into our district'. What can we do to keep them out before we have the suburbanization of downtown Toronto. Of course, their problem is that if you come from North York, you must have three coloured TVs, two skidoos and four cars and what will the impact of that be in this cute little townhouse? Again, it's fine to have cobblestone front yards as long as you have a small Porsche or Renault on it but if it's a Ford Station Wagon and a boat trailer, it's not appropriate somehow.

Those are the social implications of renewal that we are going through. It's people, it's not buildings. For those of you who watched that funny movie "Outrageous" with Craig Russell, he had this great line about, "all you women — all you talk about is renovating your house. Why don't you talk about revonating your mind". That's what we are going through now.

We are trying a new approach which we hope will be politically neutral because it's about energy. The city council, in fact, just last week, adopted what we call the "Pilot Energy Conservation Community Outreach" program. We are afraid to put that into initials because it will sound like a provincial idea. It's untested, we don't know if it will work. We know that it will guarantee 186 city hall and fringe government employees work for seven years. So that part will work. It has three pieces to it, one is information, two is fix-up and three is money. The information part, of course, is your typical coordination and explaining things to folks, hiring students to run around and knock on doors and hand out leaflets. That part is farily straightforward. The fix-up part is, I think, very interesting. It's the buildings department — building inspectors actually working with people with a little hammer and saying, 'this is how you put on weatherstripping'. So that's a very innovative part. The third part is money. We had originally proposed that we would like to give money away and the province said no, that is a waste of money. You can only give financial advice to people which is what we've agreed to. It turns out that the province wanted to give money away instead of us, so I don't mind that. They get the credit but we get the houses fixed up.

Let's just now confuse the physical solutions with the real problems of political recognition, of public and private economics, of demographics and of values because if we miss those points, we are all wasting our time.

QUESTIONS & ANSWERS

QUESTION: I'm from the region of Hamilton-Wentworth. I would like to ask Guy Legeault about the program where he alluded to landscaping of back lanes. I've never heard of that program before and I wonder if he would elaborate on that program, how it is funded and how do the owners participate in the funding, what's their obligation and what type of landscaping are you talking about. Maybe the back lanes in Montreal are somewhat different than the back lanes in Hamilton, I am not sure. I am a little bit confused.

MR. LEGAULT: Well, the financial program is quite simple. The city pays for everything. I must say 17 back lanes in Montreal is a drop of water in the ocean. It is used as an example. The landscaping itself: the lanes in Montreal vary from 12 to 20 feet. The first encouragement was to give subsidies for demolishing the sheds that were in the backyard, but when a shed was demolished, there was a potential that was not used. People were looking at each other not knowing what to do with the remaining land. After having walked in many lanes, we reported to the municipal administration that the objective was not reached as far as our eyes were concerned. The nasty buildings were gone but the place was not really properly landscaped. So, there was a fault of the city itself that the back lanes were in very bad shape. So they decided in certain instances, with the agreement of the owner, to close the lane to cars. It does not happen in every case but it does happen in many casees. The second thing is to put in a new lighting system, a proper drainage and obviously a cover to cover the area with proper material. An offer was made to the owner giving them fences and to propose to them landscape arrangements that would fit their purposes. The responsibility of the owner is to promise he will take care of what he has received and in the case where the lanes were closed to vehicles, that the owner will care about the upkeep of the area. That's the picture.

QUESTION: Is this an on-going program? Can people request the city to do this or is this a city initiative?

MR. LEGAULT: No, this is a city initiative. Obviously, there are requests that are sent to the city. Some requests are granted, some others are delayed but, actually location has been a choice of the city.

QUESTION: My name is Mel Winch. I am the Deputy Commissioner of Community Planning in St. John, New Brunswick and I have a question for Bruce Davidson in terms of the North York situation which I find very interesting being a former North Yorker myself. Bruce, you mentioned the staff proposal in terms of trying to perhaps open the by-law up to change the typical, traditional, zoning regulations in suburban communities through such things as legalized duplexes or perhaps even boarding houses. What do you feel would be the political acceptability of this program being successful? Did it originate at the staff level? Was it initiative from certain residents or tenant organizations or was it a political initiative? The other question is, do you see this occuring, if it is successful — on a comprehensive basis, across all of your R zoning districts throughout the city? Will it occur in certain areas in a neighbourhood or sub area basis to begin with?

BRUCE DAVIDSON: Politically acceptable — I'm not sure at this point. I've looked at the political situation and we've judged it to be fairly accommodating to a particular staff recommendation to open up the housing within the City of North York. We have tried to read the winds of the political machinations within the municipality. We are not really sure. We hope we have a majority of council behind us.

It will be comprehensive. There's no question. We will make it apply throughout the municipality. It's a matter of choice. It will be put in a by-law and will be up to individual residents to duplex on choice. It's not going to be mandatory; it's not going to be forced upon people. It will be in the by-law as an affordable use within the zoning categories for residential zones.

How did we get to this point? In 1976, when I took over the department, I had a zoning by-law called 7625 that, up to that point, had not been amended since 1952. I still have 10,000 of those suckers sitting in my storeroom that I have to get rid of at $10 a shot and I can't afford to have them sitting there. We have to amend the by-laws. We just can't sit around with an 1952 by-law for the city and not bring it up to date.

We still have situations where we have agricultural zones within the City of North York and our tank farms are taking advantage of that particular hold up. We have a minimum of two acre zones within the City of North York. In fact, a municipality that protects the rich by having a minimum requirement of two acres for a house, in my estimation, is exhorbitant in today's society. We just can't afford to have that anymore.

QUESTION: Question for Mr. McLaughlin. The renovation of housing stock usually requires vacant premises and the activity in Toronto has been extensive. To what extent is renovation contributing to the low vacancy rate that we have and what measures are being taken to prevent such large scale displacement from renovation activity?

MR. MCLAUGHLIN: Well, the answer to the first question as to extent; there is a lot. Like Grace Faxman, I am not a human computer with all the numbers but we've done a tremendous amount of research and monitoring on that phenomenon and there is a tremendous amount, enough that we have proposed some fairly radical new policies to prevent that. Some of our new policies are not adopted and some of them have not been tested but they go all way from saying, you cannot tear down and old apartment building to you cannot even renovate an old apartment building because you might make it better to look at — we have the legal department looking now how does one describe and define renovations?

We have this real irony where the political movement in the early seventies was to fix up old things and now that it is happening, people are saying, that wasn't what we had in mind so we are not sure what the final political outcome of that is going to be. As I say, there are lots of lawyers and planners making life difficult for people who are trying to do that. What the final result will be, no one knows.

I think it's quite interesting when we often take Americans on tours of the downtown part of the city and explain how horrible it is that people are fixing up their houses downtown and they can't believe that we consider that a negative thing but that's the case.

2 A Look At Codes And Regulations Affecting Residential Renovations

Terry Mills:

A partner in the renovation firm of Chizen and Mills, Mr. Mills is a member of the Toronto Home Builders Association Renovators' Council.

Basically, the industry's view is that it's time for planners to update their thinking. The Renovators' Council of the Toronto Home Builders' Association represents over 52 active renovators in the city of Toronto and are most concerned about the present cumbersome zoning by-laws. At the same time, we are all aware that the City of Toronto enjoys the benefits of renovation work: old landmarks and streetscapes have been rejuvenated and put to contemporary uses; rundown neighbourhoods have been given a promising future; decaying buildings have been brought up to code requirements, making them safe and acceptable. These improvements are the achievement of the renovation industry.

Renovation work is just beginning. Unrenovated housing stock is energy-inefficient, technologically outdated, of inappropriate floor plan, and in general, greatly depreciated. At the same time, these homes are an important contribution to available housing inventories. For these houses to survive usefully, a health-renovation industry is required, hand in hand with in-field developments. For the renovation industry to undertake the challenge of updating existing housing assets to contemporary standards — and the challenge of extending their useful life span — it is imperative to consider the scale of operation of a typical renovator.

The renovation industry has no giants. The industry is comprised of small businesses which are ill-suited to cope with red-tape, and are extremely vulnerable to cumbersome intricacies created by planning through the use of zoning by-laws. It should also be remembered that the renovation industry creates jobs for many skilled, semi-skilled and unskilled bread-winners. Furthermore, renovation work is significantly different from new construction and requires other considerations. At the same time, there are specific benefits: The turn-around time of renovations is faster. It is cost effective when only remedial work is required, like for example, updating for energy-conservation purposes. It causes minimal disturbance to an existing neighbourhood, and it can be universally applied.

One out of every four houses in Canada require retrofit and remedial work. It can be undertaken on a door-by-door basis, avoiding the environmental stagnation inherent to long-term land assembly and related, heavy scenarios in urban renewal. At this time, by-laws are too restrictive and are not serving the community at large or the industry.

The by-laws encompass renovation work with a no-go solution and do not permit clear passage for even the most fundamental retrofit operations. Quite frankly, the zoning by-law is a labyrinth of red-tape which could be replaced by merely having a zero height by-law, requiring all construction activities to be reviewed. At the same time, if the average homeowner knew of the restrictions this by-law placed on his property, there would be a great public outcry.

The Renovators' Council has been making representations to City Hall, to the planning, building permit, and inspection staffs, as well as to council members and the mayor. Most recently, this has produced a list of 13 amendments to reduce the zoning by-law and includes such noteworthy items as the following: 1. That third floor dormers be excluded from gross floor areas calculations: Dormers are often required in older buildings to get greater use of existing space, or increase light. 2. That decks be included as landscaping and, that, these spaces be acknowledged as being good, outdoor amenity space. 3. That open parking be permitted without garages. To date, in the City of Toronto, the construction of the garage is looked on by many renovators as a penalty of $3,000 to $4,000. 4. That bay windows not count in gross floor area calculations. The bay windows is an integral architectural element on older streets, especially in the City of Toronto. At the same time, it provides adequate light that might not be readily available, and it permits solar heat gains.

Another notable amendment has been that there should be a freeze on further additions to existing by-laws. The Renovators' Council endorses these amendments (and others not mentioned), and supports their speedy passage. At the same time, we feel this is only the beginning and we look to further changes being considered by the planning department at City Hall. For instance, that no additonal parking be required when existing unit counts are reduced. Take, for example, a rooming house which, if you were to convert it, and renovate it to the property standards of health and safety, it is not permitted — because there is no parking to start with; and now you are required to have parking. A building like that just stays in its present condition.

We would like to see external insulation not counting in setbacks, and there are many houses which have a good-quality exterior finish, but insulation is required. The only effective way to do it is on the exterior, but you are contravening the by-law in many cases. 5. That insulation units are discounted from gross floor area. In the case of renovation, if you look to full renovation where you are gutting the building, to provide a contemporary standard of insulation means that you lose five to eight of your usable floor area, and may make your project undesirable. 6. That existing gross floor area be maintained, notwithstanding redistribution of areas. Often, to renovate a building to contemporary uses and standards, it is necessary to re-allocate the spaces and, if you have a building which is over the present-day zoning coverage, you may be penalized. 7.That by-laws affecting adjacent property only be indicated as such and, that, they may be removed with a neighbour's consent, rather than going through the Committee of Adjustments. 8. That the Committee of Adjustments rules on a variance-by-variance basis, and expresses what is desirable, if the application is not accepted. 9. That representatives of the renovation industry be included in the Committee of Adjustments, to represent the industry's view.

Other things which are going on presently: The Renovators' Council is undertaking a demonstration project to show the implication of the zoning by-laws on existing building stock — it has redundancies, conflicts and contradictions. The study will also show owners the effects the by-law has on their properties. Later developments of the study will make recommendations on how the by-law can be effectively utilized to encourage orderly, responsible renovation work.

George Banz:

A Toronto architect and President of Urbanprobe Associates Ltd., Mr. Banz is also a teacher and an author in the fields of architecture and planning. Mr. Banz is a member of the Committee of Adjustment in Toronto.

In Toronto, there's hardly a re-zoning application that's unopposed and the builder-developers think in terms of years to get a re-zoning through. The Committee of Adjustment, as a result, becomes a shortcut to get relatively simple things passed without the necessity of re-zoning. The task of the Committee of Adjustment is very clearly described in The Planning Act. One of the things it says is that, the hearing on any application shall be held within 30 days after the application is received by the Secretary-Treasurer. That puts a limit on what we can do. That's how fast we have to act. Also, The Planning Act specifies specifically what the Committee can do, and the power the Committee has. It says the Committee can authorize minor variances from the provisions of the by-law with respect to the land, building or structure, or the use thereof, as, in its opinion, is desirable for the appropriate development or use of the land, building or structure, provided that, in the opinion of the Committee, the general intent and purpose of the by-law and of the official plan, if any, are maintained.

What we are really dealing with is this by-law. In the City of Toronto, this is the zoning by-law. It's only part of it because the City has a great number of site-specific by-laws. There must be hundreds, and there may be thousands. All we find are references to them.

This is the 1980 consolidation of the by-law, just to give you an idea of what's in there. Here's one sentence: "Notwithstanding Clause 1, Par. 2 and subject to Clause 4 of the said Par. 2, in the case of lot in a residential district, having a lesser front lot-line than 27.5 meters, any part of the private attached dwelling, house, or the outer-wall of a semi-detached dwelling house may be erected not less than .90 meters from the sidewalk lines, except where the sidewalk line is a flank of a corner lot, for a length not exceeding 17 meters back from the minimum front lot-line setback, or, in the case of an addition to the rear of an existing building having a front lot-line setback of less than 6.1 meters, 17.0 meters back from the line of the existing main front wall of the building, provided no part of the building that projects beyond the prescribed 60 angle of plane exceeds 9.15 meters in height, or, in the case of a building located in a lot in the central area, 12 meters in height". That's one sentence! Gripping reading isn't it? There are any number of similar ones. And there's one sentence at the end which says here: "None of the provisions of this paragraph shall apply to the lands known in the year 1980, at No. 202 Glen Road." Site-specific by-law for 202 Glen Road. Yet, I don't know what it is — I couldn't find out what it was, as it hasn't come before the Committee of Adjustment yet.

The question then is, why do we need zoning by-laws? Good question! But there's also a good answer. Why not zero height by-law for the whole area? Something like that was tried years ago in a city in Ontario and I don't think it worked out too well, except possibly for lawyers. I understand what they did, at the time was, to simply say all properties are to be zoned for existing use. Every time you want to do anything at all to a house or a building, you have to go for re-zoning or, if it's a very minor thing, to Committee of Adjustment. I understand from a colleague that in recent years this has been gradually changed, and that particular city has roughly 1500 different zones now. In other words, it sounds like every ten properties now have one zone. Anyway, this is one alternative.

Of course, the classic one is Houston, Texas, but I'm not so sure it's really applicable. I haven't been to Houston for quite a number of years, but I remember that, at that time, there were two distinct parts in the centre: In one area, it was obvious that anything went. You could see that property owners had no protection whatever from neighbours. For instance, if you had a house and your neighbour wanted to put up a car-wash, he put up a car-wash. In the core itself, large landowners owned entireblocks. I gather this was typical for the outlying areas as well, because their holdings around Houston are in the thousands of acres. As a result, when there's re-development, they put restricted covenants on the property they develop. The result is, you have what amounts to private-sector zoning, and you'll find it's far more difficult to make any amendments or adjustments because your only recourse is the courts. In the States, that could mean Court, eventually.

The public-sector zoning we have may be a headache, but I suspect that private-sector zoning will provide greater headaches in the future. I guess the Toronto situation is more complex than elsewhere, but it applies in Ontario generally.

Our courts have given the Committee of Adjustments considerable leeway so there is flexibility in the system. But it's not always used. This is quite important because it gives considerable powers to the Committee of Adjustments. Of course, we have to remember, the decision has to be within the general intent and purpose of a zoning by-law.

Then there are other considerations. One important one is releasing an applicant from hardships. Zoning by-laws often pose hardships, especially on renovators. And, we have to avoid hardships on neighbours.

We find that all property owners may not become Progressive Conservatives, but they do tend to become conservative. Generally, they don't want or like any change — we find that, of some 3,000 applicants before the Committee of Adjustments in the City of Toronto, 1981, probably half are opposed. There are usually more opponents than proponents. By the way, we don't count noses at the Committee of Adjustment — just because there's opposition, it doesn't mean we will reject an application. But, it is a function of the Committee to respect the needs of the people who live in an area. Also, talking of flexibility, Committee decisions can be appealed relatively quickly and inexpensively through the Ontario Municipal Board.

Among matters which regularly come before the Committee of Adjustment affecting residential development, there are three groups.

One is additions, like adding a room to the back, a deck at the back, or making the attic liveable. These things are very straight-forward.

The enclosure of apartment balconies is becoming quite popular. And, it's a bit of a problem. The first case actually arose because, the Ministry of Health required an apartment building owner to enclose the balcony, because the air wasn't clean enough. (It's in the Bay-Bloor area). The builder had already used the permissible area on his particular site, so he had to come before the Committee of Adjustment — as soon as the balcony is enclosed it becomes part of the area that's counted. There was opposition, but the point, of course, was made that it didn't really do any harm to the surrounding area. It was passed.

Since then, quite a few apartment building owners have come, in turn, wanting to enclose their balconies. And sometimes we wonder if it isn't just a matter of going to City Council to get a site by-law allowing a certain area, and then coming to the Committee of Adjustments and asking for the balconies to be enclosed — and a 10 bonus. But the thing that comes before us most often is setback requirement problems, problems with car parking, etc. The second group is severances — to permit more than one dwelling, where only one building stood on the property before. As you noticed lots in Toronto tend to be small. We have quite a few 17' lots, and some even smaller than that, part of the trend towards smaller housing units. The third group is probably a temporary phenomena: reducing the number of dwellings in a building. It's a matter of converting bachelorettes to family units. Now in these cases, again, usually the problem is parking. Even if there are only three units, they still cannot provide adequate parking.

In closing, the Committee of Adjustments process in Toronto feeds into a constant revision of the zoning by-laws. It's really part of the flexibility. And, it's important, especially in a city, because practically no part of it complies to present by-laws or the building code. The Committee of Adjustments not only has the function of keeping municipal politicians from getting involved but it is part of the flexibility built into the system.

Frank Burcher:
Co-ordinator, residential renovation, Housing Renovation and Energy Conservation Unit of the Ministry of Municipal Affairs and Housing.

The Ontario Building Code regulates the construction of buildings, and consists of requirements to minimize the risk of injury and property damage from fire and structural failure.

This code is oriented toward new construction. Many older, existing buildings (because of their type of construction) cannot always be renovated economically or effectively, if forced to comply with all the requirements of the Ontario Building Code. Some manner of flexibility is required and the intent of the renovation guidelines is, to facilitate viable and active renovation and, to assist in the conversion of existing residential and non-residential buildings to produce additional housing units.

I think we'll dwell on terms for a moment because we have two words, 'rehabilitation' and 'renovation' which are sometimes loosely interchangeable. Rehabilitation — and this is from the Glossary — is, improving an existing building to minimum municipal property standards without changing the use. Renovation, on the other hand, is an umbrella term for planning and improving existing buildings beyond rehabilitation. This may include a change in capacity or occupancy. When we speak of renovation guidelines, we're speaking of overall renovation of buildings, and we're speaking of voluntary renovations.

The basic philosophy behind the production of the guidelines: The first is, all renovation to be done in an existing building shall comply with the Ontario Building Code, unless compliance is impractical due to physical or economical reasons. Where compliance with the requirements is impractical, a minimum life safety performance-standard must still be complied with. Again, where renovation takes place in a portion of an existing building, these guidelines may be applied to that portion only, except that the performance of egress and detection systems should be integrated with the whole building.

Another point, all in-place components of the existing building that are not under renovation because of the nature of their continued existence, need not comply with other requirements of the Ontario Building Code.

While an existing building is undergoing renovations, it is prudent and economical to install energy-saving materials and devices to minimize heat loss and reduce energy consumption.

Stemming from June of 1980 when Premier William Davis announced that his government (in consultation with the public and private sectors) would develop residential and renovation guidelines, the start of this process was an inter-ministry committee composed of three ministries: Consumer and Commercial Relations, Solicitor General and Ministry of Municipal Affairs and Housing.

We have enlisted the aid of industry, design professions, municiapl organizations, research and standards and other interested parties to develop the residential and renovation guidelines. The first committee is what we call 'Tier I Advisory Committee', our policy committee. This committee establishes the priorities and objectives for the next working committee and task groups.

The next one is the Tier II Working Committee, which deals with the technical aspects of the guidelines. It is comprised of representatives from enforcement, industry, design professions, other interest groups, and additonal representatives, based on their particular interests. This Committee establishes the time-frames for the three task groups. The first deals with small buildings, Part 9 of the building Code; the second, with other buildings, Part 3 of the Building Code; and the third one is a heritage task group. Their objectives are to identify obstacles — technical and administrative — to effective and economical renovation and to evaluate various technical options. They also recommend appropriate technical solutions (or compliance alternatives) and to recommend appropriate administrative solutions consistent with these technical recommendations.

The task groups report to the Tier II Working Committee, and the Tier II Working Committee reports to the Advisory Committee. The Small Buildings Task Group has completed its first interim report which is included in the Status Report. Task Group and Heritage, has started its work and we hope they'll be finished in early 1982.

I've also been asked to establish and recommend triggering-mechanisms, that is, mechanisms whereby guidelines will come into use in various stages of renovations. They recommended that use of these guidelines should be automatic or, for existing buildings built under the O.B.C. dated after Dec. 1, 1975, the use of the guidelines should apply, if the original building permit for the existing building was issued 5 years or more prior to the date of application for the renovation permit.

Also, where it is impractical to meet the requirements of the Building Code, or where features or components in any building are of architectural interest, they should be retained. There has been some contention about this point. The original philosophy indicated that all renovation work be done within the existing building and should comply with the Ontario Building Code, unless it was impractical to do so. Committees have had a problem with how you define the word 'impractical'. In that sense, they have decided that, for existing buildings built prior to the Building Code, it would be automatic. This is a contentious issue and, should be settled by the Advisory Committee. Compliance alternatives for small buildings have been suggested. They range from re-using salvaged materials in buildings, allowing alternatives, such as enclosed vestibules, thermal or storm doors or storm door and windows; attempting to reduce the rquired area-size of windows and, in the case of existing stairways that are in the building, attempting to allow an extension of the stair system to be rebuilt in the same manner as the exsiting one.

Anthony J. Suprun:
Director of Building, Zoning and Bylaw Enforcement in the municipality of Haldimand-Norfolk. Mr. Suprun is a professional engineer.

Before jumping into the difficulties faced by renovators in complying with existing zoning by-laws and the Building Code, it might be helpful if we deal with the evolution of building codes: where we have been in the past, where we are today, and where, hopefully, we will end up in the future. In the early 50's, one national building code became the desire of many organizations. From that point on, the tempo increased rapidly and up into the 60s, many associations involved in the construction industry representing architects, engineers, general contractors and municipalities, were strongly advocating the concept of one national building code for all of Canada. Around 1968, the concept of a provincial building code was first discussed; and on March 4 of that very year, a resolution was introduced in the Ontario legislature, stating that the government of Ontario adopt a national building code, standardizing building, fire and safety legislation; and that this code should be applicable to all residential, commercial and industrial buildings in all municipalities in Ontario.

As a result of this resolution, a committee was formed to examine, comment and report on uniform building standards for our province. The report was to decide the merits of uniform standards, the extent to which they should apply, and the means whereby such an end could be achieved — that end being uniformity. The committee made many recommendations. Because of the great variance in building by-laws and standards in municipalities across Ontario, there was not only a need for provincial legislation, but it was perceived as an economical and an administrative 'must'.

The advantages of such a code were indisputable: It would reduce the cost of construction, and problems caused by having to build in different ways in different municipalities. It would reduce the increased costs of short production runs, and diverse inventories of manufacturers. It would simplify the approval of new materials and methods of construction.

On January 1, 1976, after seven years of study, deliberations and meetings, a building code for Ontario became law, (Section 38 by-laws under the Planning Act were superceded by that particular code.)Municipalities were required, under Section 32 of the Building Code Act, to employ a chief official and enough inspectors to adequately enforce the provisions of the code. The Ontario Building Code received a warm welcome from contractors, municipal officials, engineers and architects alike. This first move by government was seen as a very essential move to uniformity throughout our province.

We've come a long way since then. Today, we have a building code which applies equally, all across Ontario. While we have made great advances in area building codes, several problems which still lead to confusion for contractors, architects, engineers, building officials, municipal administrators, and the general public, still exist. Some examples: The Hotel Fire Safety Act, the Day Nursery Act, the Occupational Health and Safety Act, the Egress from Public Buildings Act, the Fire Marshalls Act. The list goes on and on. In addition to the difficulty faced in dealing with these Acts and regulations, one is also required to deal with several different Ministries who administer them.

The problem, as perceived here, is one of numbers. Too many provincial authorities have administrative jurisdiction.

Let us now very specifically examine the building code. Combined with the many laws an applicant faces there's the problem of non-uniform interpretations in enforcing the provision of the code, from municipality to municipality. Let's examine this problem and see if we, as a province, have prepared ourselves.

First of all, we've got to ask a very important question: Have we taken the administrative leadership to ensure that the staff enforcing and interpreting the code are adequately trained? In my opinion, the answer in full capitals is NO — this is an area which has been totally ignored by those responsible for the administration of the Building Code Act and its regulations. So, while we had the foresight to recognize the need for a uniform code, we have forgotten one of the prime ingredients to uniformity: that is, education and a base level of understanding for those appointed to enforcement.

Because of this lack of training, there are varying degrees of enforcement, as well as different interpretatons of code requirements. So, while the code is uniform in content we still lack, in the area of uniformity of code understanding and enforcement.

The Committee on Uniform Building Standards defines theeducation and certification of these officials as a prime ingredient to uniformity.

I now want to discuss the problems faced by applicants when they proposed to renovate existing buildings. Aside from zoning by-law problems, there are common problems between building officials and contractors in the application of the building code. Renovations of the existing single-family detached home for which the use is not going to change, do not present a big problem. But, depending on the degree of code-adherence and various renovations, that opinion will vary from jurisdiction to jurisdiction, from Toronto to Mississauga, to Brampton, to the rural areas of northern and southern Ontario to the region of Haldimand-Norfolk. You would get different interpretations of that particular point.

The major area of concern appears to be with single and multiple-family residential units. The major problems with respect to these buildings is, in achieving compliance with building code requirements for fire regulations, exits and structural requirements.

While there are no acceptable alternatives to the structural requirements of these buildings, fire alarm and detection system requirements could provide an acceptable alternative. Residential rehabilitation guidelines have been approved, in principle, and we are now ready for detailed review. These will be welcomed as a step in the right direction. The guidelines will hopefully allow for more effective renovation of older buildings, and will apply to housing renovations, conversions of houses and non-residential buildings to create more housing, and for the restoration of heritage buildings for residential uses. These guidelines will, hopefully, become part of the Ontario Building Code. (I don't mean included in the O.B.C., but as a separate part to that code.)

Here we get into another problem: the lack of flexibility (in the code) in dealing with renovation projects, not only of a residential nature, but in change of use and occupancy.

Today, even if there was flexibility in the code, I suspect that many rural and small urban municipalities in Ontario simply don't have the expertise on hand to allow for the code trade-offs we're talking about. The major difficulty here is, there has been little effort to train building officials or the public in the area of building codes.

The uniform building code is a welcome sign of the times, but there is need for flexibility in that code to make it work for all of us. I look forward to seeing residential rehabilitation guidelines become part of the Ontario Building Code.

The final link to the process, is to provide assistance to municipalities and the public through regular education and training programs for municipal officials involved in code enforcement. This type of training need not be restricted to municipal officials but could include any individuals involved in the construction industry. With a greater understanding by those required to deal with building codes, will come less confusion and a better appreciation for the need of good building regulations and enforcement practices. (Let's face it, this affects all of us right in the pocket book, so it stands to reason that we should all be concerned.)

Building regulations are closely tied to the problem of fire prevention and fire protection. I've been told that this is not the case — building codes deal with structural matters. Hopefully, that's not a province-wide position on what the building code stands for! In the future, we must ensure that we avoid incoming legislation, and promulgate regulations which would off-set or supercede the requirements of the Building Code.

Along with the Ontario Fire Code our objectives must be, to regulate and rationalize all matters relating to buildings. To achieve this, we should strive, as we have for an Ontario Building Code, for a system of uniform enforcement and understanding through education and certification. We should ensure that as building is a provincial concern, one Ministry is responsible for the administration of all of the Acts and regulations affecting building. The future, as I see it, includes trained officials for a very important task — greater flexibility in code requirements, and the key, I believe, to less in-fighting is, one Ministry to deal with all matters related to this task. In effect, we can alleviate many problems now encountered by the public, and bring about a reduction in effort and costs to all concerned.

Roy Phillippe:
Chief of Consulting Services of the Ontario Fire Marshal's Office of the Ontario Ministry of the Solicitor General.

I've been requested to provide you with a status report on the Ontario Fire Code and its impact on residential renovation work. To fully appreciate the issue of uniform fire legislation within this province, it's important to review the developments of the Ontario Fire Code.

The work of the Ontario Fire Code was initiated in November, 1976, under the auspices of the Ministry of Consumer and Commercial Relations through an Ontario Code Advisory Committee. The Ontario Fire Code Advisory Committee completed their task within the terms of reference in September, 1978, and reported back to the Minister of Consumer and Commercial Relations. The draft Ontario Fire Code was gazetted January 13, 1979 and circulated extensively for public comment.

During the comment and review period, approximately 300 submissions were received. The comments were comprehensive and included input from the building and development industry, realtors, manufacturers, building designers, fire, building and property standards officials, municipal and other ministries of the provincial government. During the period of January 1979, to approximately May 1980, public comment was reviewed on the draft Ontario Fire Code, and the disposition of the lead ministry was under review within the provincial government.

In May of 1980, in an address to the Ontario fire chiefs in Hamilton, it was confirmed that the fire code would be enforced at the municipal level by the fire services, and be the responsibility of the Ministry of the Solicitor-General and the Fire Marshalls office, for administration of the legislations. The fire code therefore, was to be made a regulation under the provisions of the Fire Marshalls Act to achieve this end. Bill 141, an Act to amend the Fire Marshalls Act, was drafted and received first reading in June of 1980. (This Bill did not receive second or third reading prior to the provincial election.)

Bill 141, in its initial draft form, appeared to have been unclear to industry, as well as the government, with respect to its intent. We, therefore, carried out discussions with Ministry representatives and representatives of industry, on proposed changes to Bill 141, to clarify a number of concerns.

In the spring of 1981, Bill 141 was re-drafted and reintroduced as Bill 59. The Bill received first reading May 12, 1981, as an amendment to the Fire Marshalls Act and received third reading June 16, 1981. The bill continued to undergo reviews up to the third reading, to clarify the extent and the intent of the legislation. While amendments to the Fire Marshalls Act were taking place to allow for the introduction of regulations called the Fire Code, an inter-ministerial task group was established within government, to review public comment received prior to the establishment of regulations. Representatives from the Ministry of Consumer and Commercial Relations, Municipal Affairs and housing, and the Solicitor General were included. The task group was chaired by the Fire Marshall. A highly visible and complex part of the draft Ontario Fire Code, circulated for public comment in 1979, was part 9, Retrofit.

Retrofit was defined as meaning, the minimum performance requirements for life safety for all existing buildings. Since this part of the document received extensive comment with respect to the degree of applications, as well as the socio-economic impact of these requirements, it was concluded that Retrofit, part 9, be set aside for further studies.

During the review of public comment, it was established that there was a need to co-ordinate part 4, dealing with flammable and combustible liquids with Federal legislation, under the Transportation of Hazardous Goods Act, as well as proposed legislation by the Ministry of Transportation and Communications, with respect to specifications for vehicles on highways. Therefore, part 4, dealing with flammable and combustible liquids has not been included in the completed review of the fire code at this time.

Specific revisions, within Bill 59, and amendments to the Fire Marshalls Act, have been introduced to ensure compatibility between building and fire legislation.

Building and fire codes are intended to be complementary and companion documents. Bill 59 indicates that the Fire Code does not apply to a building that is under construction within the meaning of the Building Code Act. Therefore, concerns which were expressed that the fire code could over-ride the building code on work being done on a building during construction were alleviated.

The Fire Marshalls Act allows for the provision of orders where hazardous conditions in buildings exist. It is recognized that these orders deal with existing buildings where it may be impractical, impossible (in many cases), or uneconomical to arrive at a solution to correct such hazardous conditions, according to the standards of the building code.

Therefore, in many of these instances, attempts are made to lachieve an equivalent level of life-safety in existing buildings, recognizing the principles of life-safety in issuing orders under the Fire Marshalls Act. To ensure that the owner is not penalized by having this particular order altered when he makes application for a building permit to carry out the work, provisions were made within Bill 59 to indicate that orders of this type were deemed not to be in contravention of the provisions of the building code.

The provision of this section of the Fire Marshalls Act clearly indicated that the order satisfies only the provisions of the building code and not the provisions of the Building Code Act, which required building permits. The owner continues to be required to make application for a building permit. This is atypical example of the intent to coordinate building and fire codes.

The Fire Marshall's Order will be deemed not to be incontravention of the Building Code and therefore, the building official is not required to apply the building code to the fire-related matters. It also ensures that any work, where it is outside the terms of the Order, affecting the structural integrity of the building, will be reviewed by the building official and appropriate structural assessments will be made.

There is also a provision for the establishment of a Fire Code Commission, similar to the Building Code Commission to hear appeals in Bill 59.

The regulations will not affect rehabilitation, since the first stage of the regulations do not include provisions for retrofit requirements. We are, however, in the process of establishing a Retrofit Review Task Group, with wide ranging representation from industry, municipal and provincial governments, as well as the design professions.

Renovation work, or any work that is carried out under renovation guidelines, or renovation work under the provisions of the building code, will be work initiated by the owner on a voluntary basis.

Retrofit provisions of the fire code will be applicable in correcting hazardous conditions, by establishing minimum levels of life safety for existing buildings as a condition of continued existence, and will be applied to buildings assuming no action is initiated. We are attempting to ensure compatibility between documents, by participating in the renovation guidelines. We wish to ensure that the Fire Code and renovation guidelines are compatible, so that any action initiated voluntarily will not result in Fire Code Orders on such facilities at a future date. Conversely, work initiated by Orders under the Fire Code must be considered in the light of possible renovation work in the future. The challenge is there. We recognize the need to ensure retrofit provisions and renovation guidelines in whichever form they take and it is our intention to work with other Ministris of government and industry to achieve this end.

3 Prospects For The Housing Renovation Industry

Andrew Wilson:
Mr. Wilson is a senior official with the Division of Building Research of the National Research Council in Ottawa.

This paper has its origins in three recent conferences dealing with aspects of rehabilitation and renovation in which the elements of restoration and retrofitting were also present. The first of these was the Second Building Congress held in October 1979 and called "The Rehabilitation of Buildings". The second was the conference "Ontario Renews" sponsored by the ministry that's sponsoring this one. The third was the all sector National Housing Conference held in Ottawa in March of this year. At all three the problems of terminology in the renovation-rehabilitation field were very much in evidence. This present workshop had its origins in a suggestion made to senior staff of this conference who agreed that perhaps we ought to put it out for inspection and discussion. I'm dealing here with the English terminology. I suspect our French colleagues have the same kinds of problems. This paper leans very heavily on the glossary of terms which the Ontario Ministry of Housing has already put together in draft form. It also leans on work done by Byron Johnson of Division of Building Research, NRC, one of my colleagues and others with whom I wrote a paper two years ago on the market for rehabilitation. One of the things we found was it was very difficult to get a handle on it because there were so many terms flying about we did not know where one stopped and the other started. This paper also takes into account an editorial written by James Ripley which appeared in April 1978 issue of Canadian Building in which he drew attention to this particular problem in the changing construction market in this country. Apart from what's happening in the market then and now, it's important to look at this terminology because the regulations affecting the renovation-rehabilitation-retrofitting activity are in the process of change. It would be nice if everybody used the same language.

On a personal level, I once thought that the generic term in this field was 'rehabilitation.' Now I'm not sure because most people appear to use the word 'renovation.' In any event it's quite clear that these terms and others associated with it mean different things to different people. For example, the author of a book called "Housing Rehabilitation Costs", said, as follows, "To a homeowner, rehabilitation encompasses everything from repairing the roof to changing a light bulb. To the contractor it is gutting and reconstruction of the home's interior. To an apartment owner, it is any improvement which allows him to increase the rent he receives. And to an economist, it is any reinvestment designed to forestall the capital depreciation of the structure."

To use the economic aspects of the business once again, to make the same kind of point, the following is a paragraph from my own paper. "In the literature of building economics, the term rehabilitation has sometimes been used interchangeably with renovation, restoration, modernization, redevelopment, recycling, retrofitting and simply repair. Heritage building, too, has been applied to denote rehabilitation or restoration under a special set of circumstances. The common thread running through all of these activities is the extension of the useful life of an existing building while returning it to a state of utility instead of demolishing it in favour of a new one. In the process of rehabilitation, the function of a building may be changed, but its architectural, structural, historical and cultural features or values may remain very much as they were before."

I put together a list of 34 terms in this field just to demonstrate the kind of confusion that may arise. There are two distinct groups here, those that begin with "R" and those that do not. Those that do begin with "R" are as follows: rebuild, reconstruct, reconvert, recycle, redevelop, refurbish, rehabilitate, remodel, renew, renovate, repair, restore, retrofit, reuse and revitalize. Others include: adapt, add, alter, conserve, convert, deconvert, demolish, develop, gentrify, improve, infill, maintain, modernize, preserve, stabilize, thermofit and upgrade, to which two more should be added, white paint and heritage. These words, with the exception of heritage, I've used in their verb forms, not in their noun form. You normally use them as nouns. But verbs mean to do things. So I think that's a much more appropriate way of looking at it.

One of the drawbacks in any attempt to reach an agreed set of definitions for this particular field of activity lies in the fact that the construction activity statistics products by our premier statistical agency, Stats Can, breaks the aggregate down into just two parts, new construction and repair. However, Stats Can statistics do distinguish between building and engineering construction, and in the building sector, between residential and non-residential types. We should bear this in mind in any discussion of terminology.

There are 10 of the terms which I'd like to discuss with you for a moment. These are the ones in which our main problems arise. The first of these is 'repair.' And I'm going to read a few of the definitions that you find around. I make no attempt to be definitive. Let's take a look at definitions based on this glossary largely, on Webster's Dictionary, and on one or two other sources that came to hand. 'Repair' . . to fix or mend; to restore by replacing a part or putting together what is torn or broken to; to make good; to replace or correct broken, damaged, or faulty elements in a building; to make minor renovations or alterations in order to maintain the operating efficiency of existing structures. There's six definitions of 'repair.'

'Conserve.' To keep in a safe and sound state. To preserve from change or destruction. There's preservation coming into a definition of conservation. To implement saving methods to prevent the wasteful use of a resource meaning planned management. And with regard to energy, to introduce and implement saving methods and materials in buildings in order to minimize heat losses and reduce energy consumption using planned management.

'Reconstruct.' To build again. To make over. To repair. To reproduce by new construction to exact form and details of all or part of an existing structure or a vanished structure as they existed at a particular point in time, either on the original site or on a new one.

'Heritage.' Now this is the only word that I can't use as a verb because there's nothing called "to heritage". With due apologies to Pierre Burton and Heritage Canada, I don't think Burton has been able to make a verb out of heritage. Heritage activities are usually associated with conservation, preservation, reconstruction and with structures designated by some authority as heritage buildings. The principal heritage activity is the protection of structures from destruction and decay.

'Recycle.' To pass again through a cycle of changes or treatment. To process for further treatment. To reuse and adapt existing buildings, materials or components for a similar or new purpose. To adapt an existing structure for a completely new purpose, an activity which may involve renovation, retrofitting, rehabilitation, or restoration.

Now we come to 'retrofit.' To modify to include changes made in later production models — based on automobiles and airplanes and houses. To furnish with new parts or equipment not available at the time of original manufacture. To update the components of an existing building to meet new code requirements. To thermofit an existing building for energy conservation. To bring a building up to higher standards, particularly with respect to energy efficiency, security, fire protection and modern amenities. That's just retrofit.

'Preserve.' To keep from decay. To maintain in sound condition in order to arrest decay. To retain the components of a building of historical value or interest.

'Restore.' To put back into former or original state. To put back into a certain period the form and detail of a building of historical or architectural value or interest by replicating original work in the structure. And there are several others. I'm going to skip them.

'Rehabilitate.' The original global term. To put into a previous good state. To restore to a state of efficiency and good management. To improve an existing building to minimum municipality standards without changing its use. To remove, replace and alter extensively the existing interior components of a building to recreate new housing units within the structure, and in some circumstances, to do work on the exterior as well.

Now you've got 'recreate,' you've got all kinds of words mixed up in 'rehabilitate' and you go to 'renovate.' 'Renovate' is to restore to a former state of soundness and appearance. We've heard that before. To replan and improve existing buildings beyond rehabilitation including possibly a change in capacity or occupancy. To replan and improve beyond minimum property standards. To maintain and repair a building which is ongoing, essential and universal, and which includes anything from an exterior paint job to a new interior layout or repair of plumbing.

I have given you these definitions and all the words on just 10 terms. This is the kind of difficulty we face. To sum up briefly, we need to have a clearer view of what we are about. While there have been discussions with regard to definitions before now, it looks as if we ought to have some more. Then we need to promulgate a glossary and stick with it for a fair period of time. The benefits of this are likely to be significant.

Greg Lampert:

A housing economist, Mr. Lampert is Vice President of Clayton Research Associates of Toronto.

It's hard to discuss the prospects for renovation in anything other than vague generalities when we know so little about what's going on in the industry because we don't have much information on renovation activity and various aspects of renovation. I think data is a problem which rears its head in almost every area. It must seem to those in the industry and government that we never, we economists or researchers, never have enough data. Almost any major report on almost any subject has an appendix or a special section or something which bemoans the inadequacies of the data on which the analysis in the document is based. Renovation is certainly no different from this but I think probably is worse off than most areas.

I think there's two reasons why we know so little about renovation. The first one is that it's a new area. Up until relatively recently there hasn't been a whole lot of interest in renovation. Now we are very interested in it. But it takes a long time to organize the statistical gathering mechanism.

The other problem is the problem of definitions, the glossary of terms. What is renovation? It means different things to different people. We have no standardized set of a glossary of terms by which we can all talk about the same thing when we're talking about renovation. I'll outline what we see, as researchers, as the major gaps in renovation data and I'll also touch briefly on what we think would be the best method of collecting the information. But from our point of view I'm hitting the four main gaps.

The first one is information on the volume of renovation activity generally. Now we do have some information from StatsCan which talks about renovation as a whole. But we don't have any information as far as I'm aware, which breaks it down into major types of renovation, whether it's just small renovation, large renovations. I think that's simply because we don't have that glossary of terms. We don't know much about who does the renovation, whether it's owners, or it's contractors working for owners, or renovators selling on their own. I think the major way we could get this kind of information, obviously the main source of most of this kind of information is building permit data supplemented by special questions which could be attached to Statistics Canada surveys, like the Family Expenditure Survey, or the Household Facilities and Equipment Survey. That's the way Stats Canada goes about it now, but I think we'd have to expand very greatly the range of questions that they put on these regular surveys if we're going to be able to break the information down into the kinds of categories that would be useful to us.

The second major type of information which I think we're missing on renovation activity is what types of dwellings are renovated. What are the ages of the dwellings? What are the structure types? Where are they located? We know in vague terms that dwellings in the central city, relatively old dwellings, that sort of thing, are being renovated, but it's all in this sort of vague term. As far as I'm aware, there just isn't a great deal of information which actually breaks it down in a concrete way to talk about the types of dwellings which are candidates for renovation. And I think this hinders us a great deal in looking at the stock of dwellings which we would see as being potentially rehabilitatable. That'd be a new word for you, wouldn't it? Rehabilitatable? If we had information on what was being renovated, what types of dwellings were being renovated, a better handle on that, we could interface that with census and assessment types of data and get a real feel for what the potential market would be, or potential numbers of dwellings.

The third area is, who lives in renovated dwellings. And again, I think we have some vague notions about what types of people live there: professional couples, reasonably young, people working downtown. Other than a very brief survey we did in a city we did for the Ministry of Housing a year or so ago, I've seen very little concrete information about who actually lives in these types of units. Even more important I think, or at least as important, is who lived in them before? Who was the person who stimulated the renovation by selling and selling to a renovator. I think that's another major area where we'd see we'd like to have a whole lot more information.

The fourth area in which we've found data very scarce, is what are the requirements of renovation activity. Beyond simply a supply of dwellings, what are the special needs in terms of materials and skills of renovation construction? We get a number of requests from suppliers of materials trying to explore what the upsurge in renovation activity means for their types of products. From the data as we have it, we have very great difficulty in really helping them very much at all. I think there's a real need for some heavy work to be done in trying to get a handle on what types of materials and special skills would go into renovation. And I think also special skills that might be required in renovating some of these older houses, just in terms of providing the kind of manpower that would be required for that. Those are the four types of information that we've identified. I would think that the first three, the one on the volume, information on the types of dwellings, information on who actually lives in these dwellings, would be best collected through either special sample surveys of dwellings that we know have been renovated, or as an appendage to existing StatsCan surveys, like the Family Expenditure Survey and Household Facilities and Equipment Survey. The fourth area, what are the requirements of renovation, I think, would be best — if a collection of data in that area be undertaken by a special survey of contractors. I think this could be undertaken as part of the residential building contractors' survey.

This isn't what I would regard as an exhaustive list of all the types of data which should be collected on renovation. No doubt other people will have views on this and might have other areas. It is, I think, though the set of data which would certainly we see as the most needed from the point of view of a research consultant trying to answer questions posed to him by clients. We can now, I think, answer most of the questions that are asked of us, or at least with some research asked of us about new housing because we have a very good data base on new housing. And I think if we made a serious attempt to find out more of each of these areas, we would be able to make a lot better judgments about renovation.

All of this, I will say in closing, is going to cost a lot of money. This isn't very popular in times of budget constraints but I think if we've going to talk about the market for renovation construction, I think we are going to have to address these problems of data collection. I think it's an area where we're going to have to spend some money and I think it should be properly viewed as an investment for rational decision-making in and about the industry rather than simply an expenditure of money.

Gerald Greenberg:
Past Chairman of the Toronto Home Builders Association Renovators' Council, Mr. Greenberg is the President of the Creative Home Group, Toronto.

A renovator, primarily, is a businessman. He's not out there doing all that work for the good of the community per se. He's in it to make a profit. And I'm going to start with that premise, that we're businesspeople and we're out there to make a profit. The prospects are great.

According to Statistics Canada there's about 1.5 million homes in Ontario that are over 20 years old. Homes over 20 years old were built without regard to any concept of energy conservation so, if I might use the term, the thermofit segment of the renovation industry has 1.5 million homes out there just crying for insulation, new windows, and various other areas of energy conservation.

The other need, as I see it, beyond the energy conservation thermofit area, is that the substantial number of people have changed their life style. Basically as I see it, the two areas of renovation in the near term, are thermofit and change of life style.

Now we have to break down the industry a little further. You must understand that there are two types of renovator out there. There is the developer/renovator, the fellow who goes out and buys his own house and renovates it for resale. And there's the contract renovator, the individual who comes to your home and does work in your home to your specifications and takes money out of your pocket. In the near term, as I see it, the prospects for the developer/renovator are poor. I don't think he can make money in today's market place in single family residences. My company has gotten out of that particular area because I just don't feel that we can make money, and that's what I'm out there trying to do, make a living. A developer/renovator is a gambler in the future market. When I say the futures market, I mean in terms of from the time that he buys his house, closes it, renovates it, sells it and then closes that deal, we're talking six to nine months down the road. In today's market place, today's volatile market place, you really have to be a crystal ball gazer to be able to predict nine months down the road. Any prudent businessman can't make that kind of guess. In more stable times you could rationally predict what was going to happen nine months down the road. You were able to make prudent business decisions. Today, a developer/renovator trying to predict nine months down the road might as well take his money and go to Vegas and stand at the crap table. I just think it's that big a gamble.

The only person who can potentially make money is that individual who has sufficient deep financial strength to be able to go to the resale market place from which he draws his raw product, buy and tenant his product until the market place changes. In today's rental accommodation situation especially in Toronto, you have no problem finding a tenant. But unfortunately with the interest rate situation, you can't make the thing carry. That's why I say he has to have sufficient financial strength to be able to go out and buy a substantial number of homes and feed them until the market place for the developer/renovator turns around. He then has an edge. He's bought products probably substantially less in price than what it would be a year or two years down the road when he's going to start to renovate and he then has an edge on the price increase. Most renovators can't do that. They don't have that kind of deep financial strength. They've got to renovate their homes however many they have on the go and most renovators that I'm aware of generally don't have more than four products on stream at any one time. They have to get them finished and they've got to get them sold and they've got to roll them over and take their money and go on to the next project. So I have to be pessimistic in the near term for the developer/renovator. I just honestly don't feel, in single family, that there is a market for him at this time.

The contract renovation industry, though, is dynamite. With the cost of new housing, and with the cost of interest rates, people are holding on to their homes. They're renovating them, they're retrofitting them, they're thermofitting them, they're putting on additions, they're taking their bungalows and putting on second stories and altering them to fit their new lifestyles rather than moving on. Statistics Canada has indicated that for the year 1981 there'll be $567.5 million spent in this particular area. We've come almost to the end of 1981 and I suspect it'll be substantially more than that.

The problem is at this time, that there is a need for good, competent general contractors to be able to go out and fill that need. There are a lot of people out there who are doing work. The renovation industry has come a long way over the past couple of years from the concept of the developer/renovator being a white paint artist who's bilked the public and sold their houses at excessive prices. That's no longer the case. They're being recognized as what they are, true professional builders. The contract renovator at one time was thought of as nothing more than a handyman. Well, that's come a long way too. There are a substantial number of good, solid renovation contractors out there who are doing fine, fine work and can be relied upon to provide the product that the consumer is looking for. The problem is that there aren't enough of them.

In order to fill this gap I was given to understand a few days ago that CMHC is putting together a series of seminars on techniques of renovation and building and so on and so forth in an effort to train people to fill this gap. Community colleges have upped the training programs for plumbers and carpenters and electricians and so on. The unions are trying to get more apprentices into their programs in order to fill this need. The problem, primarily up til now is that once they've gone into this training program and come out as tradesmen, they've gone to the new construction industry, they've been virtually trained in the new construction industry, they gone to it and they've had their work program geared to new construction. Which is, working from the outside in. The technique of renovating is, everyone realizes, working from the inside out. And there is a need for retraining of substantial numbers of these trades to be able to work in renovation. The entrepreneur, or the individual who is going to form these renovation companies, I think, will come from the new house building industry, not the large firms, but the small builder, the fellow who used to go to the subdivision and buy a half a dozen lots and build them and make enough money off them to wait for next year where he'll build another half a dozen. That's no longer a viable situation, and I think he's going to come into the renovation segment as the driving force, bringing with them his trades, whom he will have to retrain, bringing with him his contacts in the financial community which will assist him in running his business. I just don't know where else they're going to come from. There's a real problem there. Any renovator who's out in the street today, especially the developer/renovator, will tell you that there is a crying need for good, quality tradesmen to work in renovation.

Lastly, I want to talk about the long term prospect. I think the long term prospect will be renovation for multiple units where large homes will be duplexed and triplexed. This will be accommodated when municipal authorities add some flexibility to their zoning bylaws. Antiquated factories will be converted for multiple use, such as commercial plazas. The utilization of the loft concept, which I believe in New York and some other very large cities has been very, very well accepted. Old office buildings will be converted for multiple use, commercial, office, residential, loft, trying to accommodate all of the needs by putting them all into the existing structure. The large projects will be accommodated by the large firms.

I'm sure all of you are aware of the fact that Olympia and York is spending $50 million at the terminal warehouse building which has got to be the most giant, beautiful renovation project we've ever seen. Only a company of that size could attempt a project of that size. The interesting thing is that these people who are always in development and in new construction are now coming into the renovation segment. This is something else that you're going to see in the future. As well, I believe it's the Fidinam Group which is financing and supervising the reconstruction of the office building at the corner of Richmond and Yonge. Again, a large project that needs substantial financing with another company that is coming into the renovation field. So they will come. Wherever there's money and wherever there's activity, people will come to the market place. I think it's inherent upon ourselves as being in the industry, it's inherent upon government, I think, also, to supervise the apprenticeship of and the education program of these trades. But it will come.

The renovation industry is growing so fast it is like a baby who didn't get through the crawling stage, or through the walking stage, it just started to run. And whenever it starts to run, it's going to run blindly, and it's going to run into walls; it just needs to be slowed down a bit and it needs to be supervised.

Rob Kaufman:
Formerly Chairman of the HUDAC Ontario Renovation Council, he is President of Mr. Renovator of Kitchener, Ontario.

What I'll try and do in a very brief sense is talk about the contractors-renovators as we'll call them for a moment. We've also often focused on the developer/renovator and the people that are redoing warehousing and apartment buildings and the rest. It dawned on me one day when I was walking down the street with somebody, and they pointed up at somebody that was remodeling above a number of stores downtown and said, now isn't that a unique idea? They're turning them back into apartments. And it kind of dawned on me for a moment that there had to be a reason why those were apartments in the first place. Maybe a lot of the economic situations that we're facing today in fact are merely historical. Maybe we're going through a swing of the pendulum which has hit us before. So often I take a look at what happened to my grandparents for a moment, who built a home when they got married and lived in it until they were too old to live in it. Maybe we're just seeing history repeating itself just a touch.

I also take a look from a contract renovation point of view at another primary environment which is one of which I'll label, a little heavily, fear. The world is moving quickly and we're entering a period that I like to refer to as future shock. You get up in the morning. You read the Globe and Mail. It frightens you. The interest rates skyrocket. You don't know whether you have a job. Fear in general has caused, in my opinion, a major part of that entire renovation market.

Renovating of course is not new. It's been around forever. It's a market that probably is taking off. You've heard about demographics and interest rates, affordability in general, built up equity . . . But the market in general is being dictated in a number of different ways. It's explosive because we have a post war baby boom, the same thing that took the housing inventories and began, during the 1970's, to cause them to grow so rapidly because of the demand.

As we take a look at the market and we take a look at the renovators within the market, we find a lot of different types of people. We have the remodelers, we have the home improvement people, we have the renovators, we have sub trades who have turned from doing the electrical wiring in a new house to the electrical wiring in an older house. As you begin to take a look at each one of their business growth, it's based on the fact that they can see a demand here, naturally. They can see between all of these economic as well as social factors that there's a market they're beginning to move into.

As one begins to take a look at the renovator and/or remodeler and I'll classify them all as just a renovator for the moment, you begin to see people who're beginning to experiment, new house builders who are saying, well we remodeled once way back many years ago, let's get back into it. They come back into it, but the market has changed. To illustrate that consider one statistic that works throughout the United States; if you take the population of any particular city and multiply it times $250 per person, you have the total renovations market within that particular city. And you can take a small city of 100,000 people. There's $25 million worth of work that's going to go on in that city over the next one year. It's a number that grows anywhere between 10 and 18 percent per year, and it compounds. The market is something that has been very much in those proportions for many many years. We just brought them a little more to light because we're all looking for something a little new to do, because we all built new before. We're all taking it seriously from that point of view.

Whether or not renovating and remodeling will become what we all feel it will, only time will tell. Statistics and data are one of those things that unfortunately have been so poorly documented that it's going to be almost impossible to tell whether or not we in fact are seeing a growing industry or one that's just more visible. Ninety-five out of every 100 people that start in the renovation and remodeling business per year fail for one reason or another. Five out of every 100 succeed. Four of those 5 barely make a living and 1 of the 5 does very well. The reason for that is it's a tough business. It's a lot tougher than a lot of the other businesses. It has no cost control factors. A lot of it is experimentation, crossing the fingers, touching wood, and hoping. As more and more people get into it, it becomes quite frustrating to the people at city hall, the politicians, the consumer groups, and the rest. Unfortunately when you experiment with something as difficult and you begin to leave people stranded because you forgot how to do it, or you didn't know how to do it, or you hit a technicality that was difficult, we've got a whole new segment that has to be considered.

It appears by all intents and purposes today that we've got something that's going to be with us for a long time. My biggest fear in the renovation and remodeling market in the future is the fact that in fact we're dealing with people who are not businessmen. We're dealing with people who are principally emotional, who principally travel in esthetics, who rather like the opportunities of remodeling and renovating, and they go plowing into it without a heck of a lot of consideration as to whether or not they should find an accountant, incorporate a company, and who does the books. The renovation business as I see it today is a business that relates to the early 1950's and the house building business. The people are the same, the industry is the same. They all meet at the coffee shop at 10 o'clock in the morning just like the house builders did in 1951. They talk about where the hot spot in the city is, and everyone goes out and begins to do some work. There are those in that group that are sitting in the coffee shop this morning that are going to become very large renovators. They're going to become people with very sophisticated systems, controls, management expertise, and they're going to be able to capture a major part of the market. There are many, however, on the other side, that are going to make poor economic decisions, hurt a lot of homeowners, and we're going to have, once again, a cry for greater control on an industry. The next thing that renovators now have to look forward to are the same controls that began to come into the house building business.

For any of you who do not know renovators, I'd like you to decide to add a kitchen addition on the back of your house and decide who to use. It's a problem. Nobody knows where to start. You open up the Yellow Pages. You go to the biggest ad on the page and you say, I just hope this guy has enough money to pay for the ad. He must be good. Unfortunately, that's where the industry lies today. But that also presents a great opportunity for somebody in the renovation business. There are hundreds and hundreds out there servicing a market, but not any one of them has really been able to take a position within the market. About five years ago there was an industry we all know well that decided to become a renovator. And they opened up 35 offices in the course of 7 months, closed 35 offices in the next 7 months. That's the sort of experimentation that the average homeowner has to deal with.

Renovators are faced with a lot of problems in their growth. They have a market which really doesn't understand what the product is, a renovator who goes to manufacturers, and manufacturers looking for the renovators to try and figure out what they do with their products. It's one of the greatest market opportunities we've seen in a long time in the construction business. It's there, and it's ripe.

If you are a house builder, you've been used to having one of your finest superintendents go onto a new housing site and he can put together a 125 unit subdivision without thinking twice. When he goes into the renovation business, he can do five jobs at a time. Give him seven and he'll mess up two. The money in the renovation business can be somewhat extreme. It can be very good money providing you can make it on the two of the five jobs that made profit. The other three you've got to be able to eat on the way through.

There are different concepts to developing a company. One of the things that new housing builders have been very good at in the past, which has led very much to their success, is the ability to be giants, the ability to build in all the major heavily populated areas, the growth areas within North America. They've been able, as a result of that, to grow tremendously with a growing market. The renovator has a slightly different problem. In looking throughout the United States, we began to recognize that there was not a remodeler or renovator in the United States that has ever been able to figure out how to open up a second office. The controls that need to be exerted on the first office are so severe generally speaking, they never get to think about the second office. There are other ways to grow. One can use a franchise concept. That has the ability of each one being owned and operated and as a result of that each one is being managed, supposedly very well. There are going to be people who are going to try and build large organizations and some will make it.

If we look back to the early 1950's, not many house builders really had the keys on how to become as large as a lot of them have today. The market has been made up, to this point in time, of people who have been exceptionally good at what they do, those that have been able to work in a particular zone in a city or a particular city, that have been able to build a reputation, have never ever had to worry about placing an ad in the newspaper. They've always been busy. The question now becomes, with the demographics, coming back to that for a moment, how long word of mouth really lives on. At what stage is somebody going to have to change their style and begin to go after some business. After we come back to the homeowner who is now looking in the Yellow Pages and looking at marketing style and finding that somebody who just graduated with a marketing degree at a university decided to become a renovator and does he really know what he's doing?

In summary what I'm suggesting is that the renovation business is not a new one but its growth is one that is most definitely exciting for those in the business. It's exciting for the planners. It's exciting right now for the economists because it is most undeniably a great business opportunity. From the point of view of the home owner, they're only asking for one thing. Give us the same kind of stability that we find when we go to an Eaton's store or when we buy Shell gas and we know it's going to run just fine. They've been able to buy from a qualified and wellknown name in a market place and an industry that they've been able to get to know. As we go through this growth, they now have a whole new series of questions. If they're going to stay where they are, where do they go to try and find some satisfaction?

QUESTIONS & ANSWERS

QUESTION: Eric Kipping, Minister responsible for housing policy in New Brunswick. The last two members who made presentations mentioned the need for supervision or control of the renovators. And I was wondering or dare I ask, did you mean regulation or did you mean supervision on the job?

MR. GREENBERG: Why is it a politician always wants to get involved in your business? No, we were talking about supervision on the job site. We're not talking about getting any more government agencies into our offices or our pockets.

QUESTION: My name's Glen Allen from Ottawa.

We all know anyone with a tape measure and a pair of steel-toed boots can be a renovator, which doesn't leave much reassurance for a lot of homeowners. I'm just wondering, above and beyond having the bureaucracy descend on the industry en masse, there must be some other pros and cons to having some sort of control over things. It seems to me that the Better Business Bureau and HUDAC aren't really filling the needs that are necessary for the renovation business. In Ottawa, we sometimes are thought of as living in a bit of a dream world, but in some ways the new housing construction stopped a few years ago when the federal government decentralized or began to decentralize. It seems to me that the renovation business has taken off and to some extent has leveled out. I'm just wondering what might be happening next. There's a limit to the amount of renovating that can go on in any given community as well. I'm just wondering if somebody'd like to take another flyer on that and predict what might happen in a fairly closed community or a community that's not going to grow to any great extent. Most of the new home carpenters, tradesmen involved have gone to Calgary. So, as I say, Ottawa's fairly stable. And I think that there's, to some extent, a limited although presumably continuing market for renovations there.

MR. KAUFMAN: We got into a number of conversations over time as to the idea of licencing builders and throughout most of United States, and the City of Toronto, Hamilton, London, a few of them have licencing programs. The problem is that the ones that get licenced nine times out of ten are those who would have been licenced or capable to begin with. It's almost an impossible task to figure out how you're going to keep control over who's licenced and who isn't. If you use building permit as the format 50 percent of the jobs built never require a building permit. And as a result of that you don't seem to control things very well. The Consumer and Commercial Relations people have got an Act put together which classifies an itinerant seller. As an itinerant seller anybody who goes from door to door selling things, or anyone who does not sell from their place of business is classified an itinerant seller. The feeling was that the most important end result of all this is that fact that as long as we can come up with some way of knowing who the players in the game are, we've won a lot. We may not be able to get them all licenced and control them every job, but at least we have some vehicle that regulates who they are, and where they can be found when you want to find them. Which means that if there is a consumer who begins to throw a complaint in on a particular renovator, then it will eventually get through to the CCR group who will come back down to him and say, you took the deposit and ran, or whatever other idiosyncracy developed around that. But it's a very, very difficult task to try and figure out how you're going to control an industry that really doesn't require a building permit most of the time. That's the problem with licencing. Although, there's varying ways of looking at licencing, there are certainly some benefits.

PANELIST: And also, I think we can't overlook the fact that a little over a year ago HUDAC Ontario formed the first renovations council across the province in an effort to organize and put a professional upright honest image to renovators and particularly members of our association who are involved in that particular industry. Certainly it's quite tainted and that's why a lot of alarms went off about a year ago from the Ministry of Consumer and Commercial Relations. Well, HUDAC Ontario responded to that, formed the renovation council and have been very active for the past year and the Minister of Housing for this province felt that it was such a great effort that he awarded us the first Ontario Renews Award at our annual convention in Montreal in February. The next winners, I think, are going to get their's tonight. To get onto your second question, what's going to happen when there's zero growth in the new housing? Well, I'm from Hamilton. And we haven't had any growth for about five years, and things were never better for me, particularly in the renovation. People are staying there, they're fixing up their homes. They can't afford to move, they're adding on a bedroom, kitchen, second storey addition; there's all kinds of activity there.

QUESTION: (TOM COCHRANE) We do move in cycles. We had a bit of a housing boom this spring, and certainly things are flat now, as everyone knows. Perhaps Greg can give us a little guidance here, but I thought the next housing boom was when the baby booms boomed again, you know, and their children came on about 1995. And then there should be another boom in new housing construction. Greg?

GREG LAMPERT: Well, according to most of our projections we're supposed to be in a boom right now. But we're not. But I think, you know, the affordability thing has obviously had a lot to do with the current slump. Our projections would be that given a couple of years, and a return of affordability, that we'll be back in the 200,000 plus range with starts very quickly. We did a study in Ottawa about a year ago and the results of that study were that the underlying base there is pretty strong, and so I think you can expect that the new house market will come back. Now it's compounded by poor economic situation; in terms of the economic base for Ottawa, it's not expanding all that much because of the government not expanding, and also the affordability thing. But once you get over some of those things, you should be back in business.

QUESTION: It's Eric Kipping again. Could I clarify something that Rob said? I don't think his answer on the building permit question was universally applicable. He talked about building permits and how it wouldn't give you the information that was being mentioned. In New Brunswick, it's a municipal thing, that is, and I presume it is here as well, that building permits are issued by the municipality. And in the municipality that I come from, Saint John, everything over $100 has to have a permit — a building permit.

ROB KAUFMAN: That's not universal as such. The problem is that, if you show me a house that's got four walls, windows and doors, I'll show you how to remodel the whole thing inside without ever being caught. That's the problem. I can't dig a hole and put in a foundation and put up a house without you catching me, but I can certainly remodel it. For every system you come up with, and I suppose that's what I'm addressing more than anything, we could just arbitrarily say everything that's done over $100 needs a permit. I'm more concerned about the fact that those who comply are those you didn't want to get in the first place. It's those that are inside remodeling right now, that don't have a permit, that even if it was a $100 and up permit base, you'd still have the same thing going on. They're the ones that are really the problem.

Section B

RENEWAL ISSUES

4 Housing Renewal: Financial Issues

Jim Brooks:
Deputy Chairman and Chief Executive Officer of Kinross Mortgage Corporation.

Mortgage lenders dealing with renovations, I must confess, are nervous. Even some of my own underwriters are nervous. And before talking more globally about the circumstances in the money markets today, I think it's fair to say that there is a reason for that nervousness, because it is new, because it is different. It's a recent emerging market place in our experience. It's the spot nature of the renovation business, the speculative nature in many cases that is intimidating. The financial substance of the renovator himself will not likely be as strong as the new house builder the lender is customarily dealing with. In a great many cases, there are elements of pioneering that make him nervous and of course, some bad things have happened in the renovation industry that all compound to make the lender nervous. The lender will, and properly so, allocate his funds (which are not his, he's merely a financial intermediary) to those markets to minimize risks, maximize return and in which he will be comfortable.

What is the magnitude of the mortgage market and what are the problems facing the financial institutions? In the past 18 months or two years, there's been a revolutionary impact on the historic institutional providers of mortgage funds. No one forecast 20 percent rates or even 18. We've had ups and downs in rates over the past several years, all of a different character. Any past bulges in the rate curve, as in '71 — '73, stem from tight money if you will, as a generic term, the need to reduce the flow of lending. That is not the case in the past 18 months. Inflation is the case and investor expectation. Until and unless inflation is controlled, mortgage rates will not reduce.

The blisters upon blisters that you see in the boardrooms of the financial institutions are making the mortgage lenders very, very nervous about taking a position with respect to the future costs or the future return needed on funds. A dramatic tightening up of time frames of mortgage lending has been noticed in the last relatively few months. Gone forever, in my opinion, are the days when a builder will walk into his mortgage lenders and reserve a block of funds for an entire year with even the topside interest rate pegged to it let alone a fixed rate for the one year period. That was quite common a few years ago. It will not return.

The attitude of the people who supply the funds to the mortgage lenders and hence allow them to operate is changing. Aunt Mini is becoming one of the most sophisticated money managers in Canada and is watching very closely the short term side of the market. If the lenders can't borrow five year money from Aunt Mini, they can't lend five year money to the developer, be it a renovator or a new house contractor, or indeed a home owner. All of these things have happened and happened dramatically and quickly.

I think in my four and a half years remaining before I go out and tend my rose garden, I will not see a reversion of the mortgage market to what it was two years ago. New instruments will come into the marketplace. For better or for worse, we have introduced or will be introducing in mid-November a floating rate mortgage. Only time will tell us if the marketplace will accept that.

The really severe problem that will influence the ability of the mortgage industry to provide funds, whether it's for renovations or new construction, the really severe problem facing the industry is that of mortgage renewal. The banking system, for example, has about $8 billion worth of renewals facing it in 1982. There are no global figures available but my guess is that the mortgage industry as a whole will be facing something on the order of $25 billion of renewal, all compounding itself because the tendency now is for one year lending so those numbers are likely to be bigger rather than smaller as we flow into 1982. All of the lending institutions are desperately attempting to match the liability side of their balance sheet with the asset side of their balance sheet. The ability therefore to create new mortgages again, whether it be for renovation or new, will depend on the ability to attract funds in excess of those needed to finance that huge flow of mortgage renewal. Given all that, as a scenario in the mortgage industry, and I revert back to the nervousness with respect to renovation, and the need for comfort if the financing of renovations is to compete for the historic outlet for the mortgage funds, a number of things do have to happen.

I hesitate to use the word 'legitimize,' I don't think it needs that but a great deal of salesmanship will be required by the renovators with respect to their lenders to demonstrate the validity of renovations as an outlet for mortgage funds. Take the lender into the neighbourhood you are working in, show him the sales of houses locally, show him the nature of the market, the depth of it, the magnitude of it; take as much of that nervousness away as you can by convincing the lender what a good thing those whole project is. I'm in full support of renovations but my own underwriters have turned down projects that I would have approved had I had them in front of me.

A great deal of salesmanship is going to be required by the renovation industry to the lenders. The need for lender caution, I hope, I emphasize by the magnitude of the problem facing the mortgage lending industry in the next year or two. Those won't go away until or unless inflation is brought under control and we have no more control over that than you have. That is the state of the industry at the moment in terms of availability of funds and the attitudes of their investment.

Gerry Greenberg:
President of the Creative Home Group and Chairman of the Toronto Home Builders Association Renovators' Council.

A few years ago, when I got involved with renovating houses, the developer/renovator was thought of as a white paint artist who bilked the public with cosmetics and high prices. The contract renovator was someone slightly more than a handyman. Well renovation has grown, the need for competent renovators and the growing sophistication of the purchaser and/or home owner has driven many of the inept out of the field and what we feel we now have left is an industry of professionals. The renovator is no longer a cosmetician or a handyman. He's now a builder.

The renovation industry or more importantly, the dollars spent on renovation divide themselves into three general categories: first of all, the developer renovator of which I am one, the contract renovator and lastly, the do-it-yourselfer. Now Statistics Canada has worked out the total renovation industry for 1981 to be in the neighbourhood of $767 million. The 1978 StatsCan figures indicates 74 percent of those dollars were spent on contracted work. Should that percentage remain constant, a maximum of $567.5 million was spent by the householder in upgrading his home. The balance or about $200 million was spent by the developer/renovator. If $50,000 was spent on each renovation, then 4,000 renovated homes were put into the market place this year. Now 4,000 homes is not chopped liver. It represents a significant number of resale houses.

I'm going to deal with renovations by professionals since there is little information available on the do-it-yourself market. The developer/renovator; here is a profile of him in his business operation. He is generally a small businessman. There are no giants in this specialized field. He has some limited capital that depends largely on the line of credit extended by his friendly banker to whom he has pledged his collateral, everything he has including probably his wife and unborn child. He goes to the retail market place to purchase a portion of the existing housing stock, he attempts to purchase with large, open, vendor take-back mortgages or VTB's, or with good open existing financing; the key word is 'open.' He renovates and turns the renovated property back to the resell marketplace. Now that good VTB, or existing financing is of little value, which is why he must buy with open financing. Let me give you an example. A purchase price of $75,000 — $15,000 cash to a $60,000 VTB with renovation costs of about $50,000, financed by his line of credit for a total investment of about $125,000. He turns it back to the resell market for $149,900. The $60,000 VTB or that good existing financing again is of little value. His purchaser must either come in with cash to the mortgage or $89,900 to a $60,000 dollar mortgage or he must arrange his own financing.

In today's marketplace, though, the emphasis is to the VTB. Now the renovator must take back that good financing to benefit his purchaser up to $112,500 at a rate generally lower than the existing market demand. He cannot afford to hold this paper so he must sell it at a discount.

All of this nonsensical finagling costs money, driving up the price of his housing. What we feel is needed is for the financial community to recognize that the developer/renovator is a professional builder. He should be treated as a builder with advances to purchases of his raw product, advances to pay his trades at various stages of completion and permanent financing made available to his purchaser at the time of sale.

Now I can understand the reluctance of the financial community to advance on a purchase of raw product and then see it gutted. The thinking is that the property is no longer worth at least the original purchase price and this is nonsense. I, or any other professional renovator would gladly buy this property from them for the original purchase price. We are getting thousands of dollars of renovation work for nothing. Start thinking of renovators as builders.

Now, I want to talk about the $567.5 million spent by existing home owners on renovations to their portion of the existing housing stock. The major thrust of this segment of the renovation industry is two-fold. First, energy conservation, or as we call it, thermo-fit and second, renovation to fit a change in the family lifestyle. I'm going to deal in terms of up to $10,000. For up to $10,000, one can in the average home, replace old window systems with thermopane, change the heating system to a more modern and efficient one, and repaint or remodel the kitchen and bathroom with new cabinet fixtures, flooring, etc. and repaint — or build a complete 200 square foot addition.

Most financial institutions today, or as late as yesterday when I contacted them, will not arrange a second mortgage loan for less than $10,000. Only a personal loan. Now let's look at the real numbers involved. A second mortgage of $10,000 at 23 1/2 percent amortized over 25 years for a three year term pays at $187.61 per month. A personal loan of $10,000 at 23 3/4 percent, which is what they were asking yesterday, for a three year term, pays at $390.00 a month, a difference of over $200 a month. The difference can make or break a renovation project. There's no question about that.

Now I realize that with the mortgage loan, there's a large balance but this probably would be renegotiated into a new first mortgage later in time. In the meantime, the lower payments would allow for substantially more renovation especially in the area of thermo-fit where increased dollar savings in energy would help to offset the cost of the renovation as well as to conserve our precious energy resources.

Lastly, the increased activity by the existing householder in renovation and thermo-fit lowers the demand for the types of new housing being built today. These homes, targeted primarily at the second and third time buyer, will not as readily be sold. This potential purchaser is renovating instead of moving. And those funds targeted by financial institutions to that market should be redirected to renovation.

Jack McCreadie:
Vice President in charge of mortgages at Sterling Trust Company.

Let me tell you what I think the lenders' outlook is in terms of financing renovations. I think without question most lenders have a very positive attitude towards this type of financing. We have at times appeared too slow to accept and react to such trends but speaking for Sterling and others, we do fully appreciate the evidence and growing strength of inner-city development. The merits of such locations in today's conditions is indisputable and as well there has been ample evidence of market acceptance by the end-user so the economic viability of renovated buildings, I'm sure, has been proven and is growing in terms of acceptance. In fact, as a mortgage lender, I look at the future mortgage markets and realize that overall demand for mortgage financing in the new housing sector is going to be so significantly curtailed, I think financing of renovations and renewals, if done prudently, has an opportunity for growing importance in our business so I see it as a market opportunity.

I'm not able to give you any meaningful statistics to illustrate the growth of mortgage financing in this area but I have no doubt this type of financing is commanding a larger and larger slice of the mortgage financing pie and this, I am sure, will continue. Notwithstanding this very positive attitude by lenders, one cannot overlook the general conditions and constraints on mortgage lending. Never before has the need to adapt and innovate been more critical than it is today. We, as financial intermediaries can only survive by realizing a positive spread of 150 to 200 base points between money taken in and money lent. We have no difficulty attracting money if we pay the right rate but we have enormous difficulty getting people to invest their capital for any fixed term of say one, three, five years and of course in the past, this has always been the main source of mortgage financing.

Will it ever return? I think it will in some degree. I suspect that we won't see any great influx of GIC deposits but I think we will see some stability coming back into the GIC market. I think that we still see different types of mortgage instruments to accommodate floating rates. We will have to provide for alternative options for renewals and the introduction of new investment vehicles such as tax free five year GIC's might be a possibility on guarantee certificates. We might see certificates with participation clauses whereby the borrower — depositor has a fixed rate but also has a participation. I think these are a little bit in the future but I think those are things that are going to have to be looked at.

What are the practices as far as lenders on renovation? Our experience has covered single family dwellings, duplexes, tri-plexes, etc. up to the occasional ten or twelve unit apartment building. Invariably we find a location is commendable although sometimes we have difficulty conjuring up the same vision for the neighbourhood that the builder or entrepreneur has. We, like most other lenders, try to be careful and realistic in our evaluations of the end product and although we approach the subject much like a builder's loan for new housing, we do try to give credit to the locational strength of the particular property. We are somewhat conservative in estimating interim draws because we are conscious of the possible need, albeit it hasn't happened too often so far but we do have to be conscious of the fact that at some point in time, it may be necessary for us to take an unfinished building, in the event that the borrower gets into difficulty, and complete it.

We do look for equity and I can see that we do have a gap in terms of how we finance that early stage of doing renovations on property but I guess we are growing. I think we are coming into the thing a little better than we were but we do have a gap there. There was an old saying in the business before, the equity of the builder was really the difference between the amount that he applied for and the amount that he actually got. I think that the reality now is that there has to be good, hard equity in the property.

In setting interest rates, it's fairly universal that the interim rates will float off bank prime or the lender's short term paper and that will continue until completion when either a fixed or formula rate cuts in. Some companies treat the loan as a collatoralized personal loan until the property is finished and the user is in occupancy before the take-out loan or permanent loan is put in place.

Borrowers we find are usually moderately sized companies formed by building contractors, architects, owner-users or entrepreneurs and as such, they do not nor are they encouraged to take on very many projects at one time. As might be expected, lenders are quite cautious in accessing such credits but there is nothing quite like a successful track record to build confidence and so far the lenders that I have talked to, including ourselves, the experience has been quite good.

Lenders also concern themselves with local regulations, naturally, zoning, building by-laws, etc. and often in redevelopment areas, this is difficult to determine or define. Some lenders, including Stirling, have had some bad experiences through ineffective by-law enforcement and misinterpretation of the requirements, so we and other lenders are very cautious and anxious to make sure that these matters are covered.

Underwriting the credit worthiness of the end-use results is an important area for the lender. Generally the same criteria for examining debt service capacity is used and, as a matter of fact, in our experience to date, we have found that usually the credit strength of the borrower, the end-user is very much above average.

What lies ahead? I've tried to turn my thoughts to the three segments of the triangle here: the renovator, the lender and the end borrower and this is the way I see the situation, developing. I think that for the renovator, there will be increasing opportunities on the demand side and I say that crosses over to the lender as well because as I said earlier, I really do think this is a market that we as lenders have to be very positive because it's certainly a growing market. The starts I think this year in new housing are estimated to be about 170,000, next year they are estimated to be about 145,000 and the need has been projected to be about 220,000 so the new house field is obviously going to contribute greatly to demand for accommodation.

I think for the renovator, there will be increasing cooperation from the lender, albeit with a greater variety of flexible financing packages.

I don't see any real significant easing of regulations, thus perpetuating the need to be patient and creative and obtaining design approval. I think there will be continuing emphasis on energy efficient accommodation. I think also there will be some important changes to the National Housing Act which will affect borrowers and lenders. For example, I think some of the things that the CMHC have in mind will very much directly affect the renovation industry. I understand they are endeavouring to change the act so that they can cover second mortgages.

For the lender, this is what I see — the need to tailor financing to not only its own funding sources but that of the borrowing community because it is becoming an important market. I see also the need to closely monitor values in redevelopment areas in order to accommodate the rising values without being caught up in hyperoptimism. I see the need to be selective in dealing with contractors who have the capacity and the strength to perform in such a manner as to ensure their long term success.

Now for the user, I would make these comments. Except in isolated cases, renovator properties will not contribute greatly to the affordability crunch in housing. There will be increasing opportunities for the user to select accommodation in renovated inner-city properties. These prices will rise appreciably and the typical buyer will have to have above average equity and debt service capacity. The overall desirability of downtown real estate will continue to be enhanced and the general health of core areas will continue to improve in most major urban centres.

Barry Lebow:
A mortgage broker and a renovator in Toronto.

What I'd like to talk about is how you can use financing to-day and still make money in the renovation business. You notice I say that's what I'd like to talk about: unfortunately, that's not the reality right now. The realities right now is that the market has changed. I've watched this market as an insider for over 13 years and the last six months have seen a drastic change. A house that you could have made or I could have made a $15,000 profit on six months ago, now has a loss of $10,000 — the same house — why? Well, things have changed.

First of all, the cost of financing that house has gone up. It's gone up considerably as we all know. What else has gone up is the trades, the material going into the house but most importantly, the end price has dropped. Now a $15,000 profit becomes a $10,000 loss. How do we change that? How do we go into this business or look at it from the middle point of view, to get the money to finance property to come out and make a very dirty word, in some circles, a profit, because that's what we are here for, how to make a profit renovating houses, using financing.

I want to go backwards for a few minutes. For many years, the mortgage market was a very loose market. The majority of mortgage funds were private, the majority of mortgage money coming in was always from private sources. The institutions were not big lenders. I could be corrected but it wasn't until the late 1960s that the banks started to get heavily into the mortgage business. We started seeing larger trust companies coming in but until that time, it was the private institution as the private lender, a lot of times controlled by lawyers and accountants. There was a large amount of private funds controlled by mortgage brokers, where today a lot of the mortgage brokers are dealing strictly with institutions.

The renovator themselves found it wasn't that difficult in, let's say 1966, 1967, 1968, to get a mortgage of more than the value of the property from the private sector. As long as you had a pulse, you could get a loan, it was that simple. Times started to change and what started to change was interest rates going up a lot of the private money started seeking other avenues. Mortgages were not as attractive as they used to be for, let's say, a doctor who had monies to invest or another type of professional. What happened? A lot of the private money was going into the bank when rates were low at the bank and borrowing was putting the money back through private mortgage lending and picking up a spread on the dollar. That's dropped. That's gone. So we've lost a lot of the private investors so the mortgage brokers themselves had to go to institutional sources. Unfortunately, for the institutions themselves, the banks are not the main institution nor are the large trust companies. It seems that the smaller trust company, such as Sterling, are the trust companies that seem to be moving with the renovator. The larger company has a little bit of trouble with an entrepreneur being able to take a square peg and put it into a square hole.

One of my main points of advice today for those of you who are renovators or looking to renovate is if you do not cultivate a mortgage manager of a trust company you've got a problem. You need to have one on your side.

You buy a property and you have to look at vendor take-backs. The idea of buying a house for all cash is wonderful if you do have a hell of a good line of credit at the bank and you want to pay those rates. It's cheaper money to get the vendor to take back but that mortgage is not a good mortgage when it becomes time to sell because the mortgage itself is not large enough. If you have a house costing about $60,000 — $150,000 the mortgage is not large enough. You can get killed by taking back the large second mortgage and that is happening today to a lot of renovators. They are getting offers, they are looking for at the end price and the offer price and not thinking about what they can do with the paper that they are supposed to take back. In a lot of cases, the paper is not saleable.

The other thing that is changing drastically in the last few years is the second mortgage. There once was a very large second mortgage market where I could sell a piece of paper called the second mortgage just by telephone in the city of Toronto. It would take a couple of weeks for the lawyers to finish up their work and I would have my money. Today, a lot of renovators are still playing that game. It's changed. An agreement of purchase and sale any renovator that is not putting in certain clauses such as: 'they have the right' or this offer is 'conditional on the purchaser being credit approved' is in trouble. What if you take back the paper and you find out the guy's a stiff and you can't sell the paper. What good is the paper? You have to be able to liquidate to get rid of the second mortgage you take back. I would state that very few real estate offers have clauses allowing for post dated cheques or pre-authorized plans yet most institutions, if I were to sell a first mortgage today, would probably want either postdated cheques or the pre-authorized plan. Now my purchaser can come and say, "Hey, that's not in the agreements. I'm not going for that." It's a very fine point, very small and I can't sell the paper. I want the right to be able to sell my mortgaging and it gets very difficult if you don't play the game, by 1981 rules. Things change.

The banks themselves are going to have to look very strongly at the renovation business. Mainly, because we may be one of the last games in town. The new house business is not as large an industry as it was and every year it seems to be getting smaller. A lot of the suppliers who once did not look at renovators are now looking at renovators, eyeing them as a large, new market. Things have changed. The banks will change. It takes a little longer that's all.

We've been through this before. What's happening right now happened in 1974. On April 9, 1974, we faced something like the land speculation tax which people believed killed the real estate market in 1974. I don't believe that. What killed the real estate market in 1974 was an unprecedented 12 percent first mortgage rate which the buyer refused paying. They refused to pay 12 percent for a long time, but you know what? People started buying houses again. People will buy houses at today's interest rates once they get used to the fact, these are the rates. I do not believe that inflation is going to be cured. I don't believe that it's going to come down that much but the public will adapt once they get the mentality through that the government's not going to give something and the government's not going to do something, and that's the way it's going to be and if you want to buy a house, you are going to have to pay the piper. It's just that simple.

For the renovators themselves, I think that we are going to have to live with these interest rates and I don't believe we have to discount mortgages to such a degree that it eats up profit. Why should we take discounts back on certain pieces of paper where we are losing $6,000 and $7,000 and $8,000 discounts?

The middleman, the mortgage broker himself, can serve the renovator because of the fact that while the renovator is busy getting his project together, the mortgage broker is out there for many different sources. There still are a lot of private sources for money. I'm not going to stand here and tell you today that there's cheap money available. It does not exist. Besides paying the cost of the mortgage, you are going to have to pay the fees for arranging the mortgage. Mortgage brokers don't do anything without getting paid for their services. Lawyers have to get paid, appraisers have to get paid. It becomes expensive, it has to be built into the costs of the renovation but that's part of it.

Now the vendor take-backs are good. I've heard of a new gimmick on the market today. All trust companies are sitting with old GIC paper, that is, deposits they've taken in at low rates that they are stuck with. I've had two trust companies recently make offers. They will take about 75 percent of the value of a mortgage, so for arguments sake, let's say I am holding a $100,000 first mortgage at 15 percent. Normally I would have to discount that paper to today's interest rates, in some cases of 22 — 23 percent to trust companies. At 15 percent, I can sell that mortgage almost dollar for dollar for the first 75 percent of that loan so I'll get $75,000 dollar for dollar. The balance of the $25,000 or 25 percent — they want me to take, as GICs. In other words, I will take back their GICs at 12 percent with three more years to go or 10 1/2 percent or whatever so they get rid of some GICs. I can cash out to a large degree. In one case, we've been offered 12 percent GICs. When we look at 12 percent and what it's costing us to carry at the bank, it's cheap money in many respects. It's a new idea. It's a new gimmick. I know of two trust companies right now that are doing it and unloading a lot of their paper that way.

The other thing that a lot of the renovators are looking at is the client I could sell a mortgage a year ago, who now does not want to be part of the mortgage business. There is an excitement to being part of the renovation business. In a lot of cases, a lot of renovators in the city of Toronto now, have partnerships where they are putting up none of the money; the investor puts up all the money and is splitting the profits with the renovator. Now that's another way of looking at it to get into partnerships to renovate. That is not uncommon in the city of Toronto. It's a very common practice. A lot of the people would rather see their money working for them and see the product turned over.

As for interest rates themselves I believe that we are going to see mortgages change again. I believe that you are going to see mortgages that are adjusted every six months; call them VRM's for variable rate mortgages or whatever. Adjustable mortgages, I think that's inevitable. I think that's the future. The consumer will be getting used to it. It just takes a little longer.

If you are serious about renovating then you are going to have to cultivate some sources of financing, from the private sector too. You have to ask around. Who's got money? Who's been investing? Who is a traditional mortgage lender? When I tried to find mortgage money, when I started this business, I had a young law student who was just starting. I paid him to go search titles of other renovator's houses to see who was lending them money. That's how I started finding out where sources of funds were and I went after the private investors and lawyers that were putting in and I went back to those same sources to find out who they were and what I could do with them and that's where I started off by getting money from them. It's a little easier to do it in a smaller registry office than Toronto.

The main line is that you have no apologies to make, you are in business to make a profit. You are also in the futurist business today. You are a speculator, a renovator is in it for one reason and one reason only, profits. We take great pride in what we do for a living. Stand back and look at the finished product; it's a great sense of accomplishment but the bottom line is you've got to make some money at it.

In summary, I feel that there still is a way to make money in this business but you have to be very careful of your financing and it all hinges on being able to cultivate certain sources, private and small institutions — I really don't believe the banks or the large trust companies are our salvation.

QUESTIONS & ANSWERS

QUESTION: What kind of reception have you had from the insurers?

MR. GREENBERG: Personally, I have not approached any mortgage insurers. I have the resources to be able to do my own work but, in talking with my associates in the field, the reception generally has been negative to insuring a project. They will talk about insuring the project at its completion stage but not during the construction stage and where we need the money is during the construction stage.

Is the financial community going to be able to, for less than $10,000, provide second mortgage financing to those people who want to upgrade their home, whether they thermofit it or change it to meet a new change in their lifestyle, to facilitate the renovation work? I think there's a crying need for it.

MR. BROOKS: Well I am one of those vicious villains who won't make a mortgage loan smaller than $10,000. We lose money on them. Just as the renovator is entitled to make a profit in his line of endeavour, so should the people in the financial community and one of the difficulties, I think, in dealing with this kind of question is that most people forget the fact that money is just as much a commodity as the two-by-four is and if we can't buy wholesale and turn around and retail it, and make a profit in so doing, we can't stay in the business and that's part of the difficulty in stretching out the term. I'm not suggesting we are, with purpose, working against the renovation industry but it's a fact of life in the banking community certainly that there is a vehicle, albeit it might cost the borrower more absolute dollars per month to carry, but the vehicle is there. We, for example, don't make second mortgages at all. They are all done under the consumer banking operation and they are then available and they are on longer terms than three years. I can't speak for the trust industry but I'm sure Jack will.

MR. McCREADIE: Well, I think the problems that

Jim has outlined are the same ones that we have. It's simply too costly to operate on a mortgage basis and of course, as far as the borrower is concerned, it's very expensive in terms of setting the loan up and we have, I think, there's some greater flexibility on the consumer side but I have to say it's a problem that we simply don't have an answer to. Maybe we haven't addressed it carefully enough on a collective basis but it's simply not profitable under $10,000.

MR. O'BRIEN: I think what shouldn't be overlooked is that if we are talking a second mortgage, there's obviously a first and I would think if I was going to do some own improvement in my own home, the first person I would talk to would be the lender holding the first, perhaps increasing the loan amount on the first. Let's not think that because there's difficulty today in looking at the second mortgage approach, the lender who has your first wouldn't be susceptible and this is all a question of us all getting to know more and more about each other's business in getting this whole thing organized to where we feel comfortable with renovations. Surely you will be able to, in many cases, just add to the existing amount of your first mortgage.

QUESTION: Are you increasing density downtown through renovation?

MR. GREENBERG: Certainly we are capable of doing it and in my own company's case, we have done it. In two particular situations, we took a large, three storey victorian style home and converted it into a duplex and in another case, we took a pair of large three storey Victorian homes and converted into a four-plex. There's no problem with it.

The problem is the municipality's zoning by-laws. In most cases, the areas where the homes lend themselves to this kind of renovation, the zoning doesn't fit. I presume you are a planner, since you asked the question. The renovators would be delighted to work with you and with any other planner and certainly the members of the Toronto Home Builders Association, of which I am chairman of the renovation council, are trying desperately to work with Toronto in working a plan whereby there would be more flexibility in the zoning of designated areas to allow for this increased density. I would like to go back for a second. You know, we had the bachelorette problem in Parkdale some time ago. There would never have been all those bachelorettes if there wasn't the need for the increased density of housing downtown. Unfortunately, for various reasons, they were illegal. The need is still there. The requirement is for higher density in these large homes which are no longer energy efficient or the people don't require them. Also we are seeing a need for people to have incomes out of their property in order to carry them and so with these larger homes converting definitely makes sense.

5 Housing Renewal: Municipal Issues

Melvin Winch: Deputy Planning Commissioner of the City of St. John, N.B. A former planner in various Ontario municipalities and a consultant in private practice.

The Conference has asked me to discuss the question of municipal policies and programs relating to the Housing Renewal in the city of St. John. Three questions were posed to me: what policies has St. John adopted for the renewal of buildings for residential purposes? What degree of importance has council placed on these types of policies in relation to other issues? Thirdly, what will future policies be for municipalities with significant older housing stock?

The problems and challenges that presently face the city are, of course, not unique to our community but are present in most urban areas in this country and others. The local circumstances are obviously different and, in this respect, the ideas and programs presently being pursued will hopefully be of interest to other communities. I would note, in terms of the session perhaps some of you attended yesterday with what I call the big city planning directors who have had to cope with some of the urban renewal and housing renewal problems in their communities. I think you will see as I go through my comments and my remarks, the situation is very different in St. John vis a vis the economic, the social situation and of course particularly the age of the structures themselves.

Being a relatively newcomer to the city, I am obviously not the most informed person to proved you with historical, geographic, social or economic facts and figures. The following brief information is, however, intended to assist you in understanding our present situation and revitalization and renewal programs.

The City takes the form of a linear strip situated on the Bay of Fundy. It comprises a large, geographic area about 120 square miles and the present population is about 85,000 persons. These figures relate to the city itself and not the urban region or census metropolitan are.

The city is old, having been visited by Champlain in 1604 and settled more than 200 years ago by thousands of United Empire Loyalists. St. John is the oldest incorporated city in the country and, in 1985, will be celebrating is bi-centennial.

Central to the discovery, settlement, economy and way of life has been the city's maritime position. Trade and commerce was, is and will continue to be the primary activity for the community. Associated with this characteristic is the industrial nature of the city. The city has two large pulp and paper mills, a major sugar refinery and the largest old refinery and privately owned ship building company in Canada.

While residents are proud of their city and most will support the growth of industrial development, there can be little doubt that there have been a number of problems resulting from the predominance of industrial activity. Air pollution and expanding port and heavy truck traffic through residential areas do conflict with the objective of improving the residential quality of life in any community. This is also the case in St. John. It is particularly important when dealing with the issue of housing renewal.

St. John, as I have already cited, is an old community. The original settlement area was along the shores of the bay and very close to what is today the city's central business district. The south end, to which I have already referred, comprises a peninsula which is surrounded by the port. It formerly contained some of the most outstanding homes in the city and was the most prestigous place to live. In 1877, most of the buildings on the peninsula were destroyed in the great fire and more than 13,000 persons were left homeless. Almost immediately, rebuilding began and architects, craftsman and builders from several areas of the country, as well as other nations, came to St. John to work for the Establishment of the day.

The building boom resulted in a variety of styles including those identified with the Victorian period which was prevalent in England, New York and Boston. Several hundred of these post-fire structures, mostly constructed of brick, remain today and the city has one of the finest, complete sections of period architecture to be found anywhere in Canada.

As is the case with the other areas both in St. John and other cities, the sought end has been in a state of decline for many tears. Financial and retail businesses have been progressively leaving and new homes have been built in outlying areas. In response to the problem of decline, the south end has received considerable attention through a number of policies and programs.

The city's municipal development plan or the equivalent of the official plan in Ontario, which is presently under review and which was approved in 1973, recognized the problem and delineated a number goals and policies that were intended to arrest the decline of the south end. Unfortunately, most of the plans policies were too generalized and did not provide sufficient details as to how they were to be implemented. A more localized neighbourhood plan was subsequently prepared and this became the basis of the neighbourhood improvement program for the south end.

More than $4 million has been expended by all levels of government on such improvement as streets, parks and recreation centers as well as through grants and loans to restore more than 300 buildings under the Residential Rehabilitation Assistance Program, better known as RRAP.

While NIP and RRAP have been successful, they have not gone far enough. The south end is, today, characterized by too many abandoned buildings which become the easy targets of vandals and arsonists. Municipal directives can remove dangerous and dilapidated buildings but is costly procedure to the tax payer. More important, the end product is another vacant, neglected parcel that is typically put to unproductive uses such as a parking lot. The decline continues. The problem of abandonments and demolitions is a very serious one in the city of St. John. It, of course, results from the age of the buildings in the city particularly in the south end. The cycle of abandonment, demolition, and non-replacement results in population loss. More important, remaining residents and businesses have little incentive to improve or even maintain their properties so that cycle continually repeats itself.

It is quite apparent that the city cannot permit the trends to continue. The abandoned buildings which, because of insufficient inspection, and lengthy legal procedures, take anywhere from six months to six years to be condemned and removed. They are a liability to public safety and require the constant attention of the police and fire departments. Their demolitions are usually at public expense and result in loss of taxable assessement.

That is enough about St. John's past and the unfortunate situation which has evolved in the south end. What has the city been doing recently and what can be done to turn around some of these trends?

It seems to me that a number of policies, programs, actions and attitudes are necessary and possible to bring about revitalization and renewal of housing in the south end of St. John. And I would categorize these in the following three ways. Firstly, I believe that the renewal of the south end for housing purposes must be perceived as part of the rejuvination of the central business district. This really means that a wider interest must be created so that the advantages of living in the south end will be reinforced by the advantages of working, shopping and visiting the CBD. The problems and negative attitudes prevalent in the south end are also characteristic of the CBD.

In the last four or five years, a general revitalizaton and redevelopment program has started to take shape. In 1977, the first phase of Brunswick Square, comprising a shopping mall, a twenty storey office tower and 655 space parking garage, opened. In March of this year, a chain hotel was added to the complex thereby attracting more business groups and visitors to the city's core. It is hoped that in the not too distant future, the project will be completed by the addition of a department store.

Currently, the most exciting endeavour in the city is the Market Square Development Project. This basically sits on the harbour itself. Almost ten years in the making, it was not until October 1980 that the financial agreements were worked out among the three levels of government and the developer. The first phase of the project, with an estimated value of 70 million dollars, will include a parking garage, retail and office space, a trade centre, a regional library, hotel, 175 housing units and a marina, all surrounded by a waterfront walkway joined by an elaborate series of pedestrian links.

It will be sometime before the success of market square can be assessed by the concept of offering the consuming public an intown, all weather shopping centre, supported by other services and amenities. It will, not doubt, enhance the image of and provide practical reasons for residents and visitors to come uptown. Combining this with new housing accommodation for a variety of groups, together with generating almost 1,000 jobs, will also ensure that the rejuvinated central core will become a people area to be used and enjoyed beyond the typical nine to five business day. Projects such as Market Square and other CBD improvements such as a series of tunnels and walkways that will connect the various buildings from the foot of King Street to the head of King Street similar at least in concept to what occurred in Toronto quite recently, will make the core area a much more attractive area and will have a significant spin-off on peripheral areas such as the south end. The convenience of working, shopping and partaking of other services is a relatively compact area should prove most desirable and will reinforce the prominence of the City Centre. This is paricularly the case given the substantial transportation costs of energy which have been forecast.

The second postitive step, I think, which has to be taken, and perhaps it's assumed to be self evident, is obivously the one of trying to minimize what I consider to be conflicting land uses in any given area. While the success of renewing housing in our south end will be dependent on the success of creating a new interest in the CBD, it will also be necessary for government to provide both owners and tenants amenities they expect to receive in conventional neighbourhoods. Inner city neighbourhoods have all too often been the repository of less than desirable uses and activities. This could be the bakery, originally small, family owned and serving its local customers by horse drawn wagon but having grown over the years into a national producer so now their residents are inconvenienced by the start up of a truck transport at all hours. Or it could be the corner service station which, in order to be competitive, must offer the convenience goods for sale along with traditional automotive services. These illustrations are not intended to suggest that residential neighbourhoods should not have been supporting retail service or even industrial activities but rather that the primacy of the neighbourhood should be homes.

The south end of St. John similarly has its share of conflicting uses. I remarked earlier that St. Johners accept the industrial nature of their city and perhaps are more prepared than other communities to tolerate some of the inconveniences of residing and working in close proximity to industries and transportation activities.

The port has been termed St. John's life line and handled more than 16 million ton of cargo in 1980. It is the fourth busiest in the country and is the city's largest employer. As a result of it's being completely ice free year round, and its being the nearest port on the Atlantic coast to central Canadian and eastern United States markets, business at the port has increased over the past number of years in both absolute and relative terms. It is likely that such trend will continue and this, of course, is good news. Unfortunately, however, as the port expands and thrives, the impact upon nearby neighbourhoods becomes more significant. Additional lands have to be required, frequently through expropriation, and nuisances such as rail and truck traffic increase. Such has been and will continue to be the situation in the south end.

About a year and a half ago, the city amended it's development plane to permit the establishment of bulk handling terminal to accommodate the shipment of potash which is commercially mined in nearby Sussex. This soon to completed terminal will be located along the southern perimeter of the peninsula and most of the 30 acre site is to be reclaimed. Potash will be brought to the terminal by rail — each train will comprise up to 60 cars — the product will be unloaded and stored in a structure almost ten storeys high from where it will be loaded on ships and sent to various destinations. The new facility, which will create about 20 to 30 new permanent jobs, is to be situated withing 400 to 500 feet of existing housing.

The project was municipally approved rather quickly despite significant opposition by a number of southenders. My reason for discussing port development or new employment opportunities or economic growth is to illustrate, at least in the case of St. John, that it can counter the efforts with respect to neighbourhood improvement and housing renewal. As in all activities, a balance is required amongst all competing interests and hopefully such an objective will become more acceptable in the future.

Perhaps before going on to my third policy or initiative, which I think will most significantly assist in the rejuvination of the south end, I think, as I indicated earlier, some of you people did attend that session, yesterday, in which the big city planning directors were present. It seems to me the opposite type of situation has evolved in their cities. The problem is that certain industrial entrepreneurs are not capable or are not able politically to expand certain bases of operations because of opposition from resident groups. Basically, the opposite situation has evolved in St. John where the industrial type of activities has always been considered to be quite paramount.

The third initiative which I think is very important and which I want to spend a little time with is that of heritage preservation. The two policy areas already described — that is revitalizing housing and CBD rejuvination and minimizing conflicting land use activities, while applicable to St. John, also have relevance for most medium-sized cities. A program, which, however, we hope will be very instrumental in seeing the south end revitalized is that of heritage preservation.

It is ironic that the city intends to capitalize on its fine stock of heritage properties which have only remained because of declining south end. The concentration and potential of heritage properties has been recognized in a number of studies carried out by all three levels of government as well as other agencies. In May of this year, an implementation program sponsored by the city, province and Heritage Canada recommended the establishment of a heritage preservation area as an important means of creating a distinctive and attractive image for a major portion of the city's central core. Preservation areas which have proven successful in other communities such as Gastown in Vancouver and historic properties in Halifax, present the opportunity to preserve elements of the community's past but also can be instrumental in bringing about economic revitalization.

The city's preservation area program involves a number of actions particularly on the part on municipal government. The city will, about two weeks from now, enact a by-law to designate those properties which will be affected by the heritage area regulations and this area is outlined on the map. The St. John by-law, which has been approved in principle, will protect the existing external character of those buildings deemed to be of historical or architectural significance. In addition to building permits which may be required, work, excluding maintenance, will require the approval of the Preservation Review Board and it will have to comply with the standards set down in the by-law. The standards deal with such matters as building set back, height, fascade proportions and building materials. The by-law does not prevent buildings from being demolished but such can only occur with the owner documents if the property has been on the market for at least six months. The preservation area by-law should, at a minimum, stabilize investment and hopefully create a climate for property improvement and new investment by creating a distinctive and attractive image.

Of course, a by-law consisting of rules or regulations is not sufficient to ensure business in a residental renewal. The public sector will have to increasingly involve itself in an active way in the renewal process. The Federal Government and CMHC should extend RRAP assistance which has been successful in St. John and revise a national building code to facilitate improvements to and renovations of older buildings. Legislation should also be enacted so that the financial incentive for maintaining and restoring older properties is no less than that available to the new building industry.

At the provincial level, it will necessary for government to protect it's investment in the central cities. It must seriously consider enacting legislation so that property taxes can be reduced, suspended or deferred as a means of encouraging the rehabilitation, maintenance and occupancy of our older residential buildings.

The most significant public rule however, will have to belong to local governments which has power to adopt planning policies and regulate land use. It will have to create a climate to encourage and stimulate renewal in the core areas. This will mean improving the streets, parks, community centers and other facilities that were assisted under the former Neighbourhood Improvement Program. I will mean carrying out a regular program of building inspection and enforcement of the minimum standards code so that buildings do not deteriorate to the point that they have to be demolished and the residents dislocated. While it may not be in vogue to suggest that the city should become a developer, builder or landlord, such will probably have to be the case, particularly in the early stages of the heritage preservation and renewal program. I am pleased to report that the city of St. John has already started such a process by offering for sale ten city-owned properties to a recent proposal call. Two buildings have been sold to date and they are to be rehabilitated and reused for residential and business uses and are consistent with downtown revitalization and our heritage objectives. The city has received a great deal of favourable publicity regarding this recent competition and, incidentally, we are constantly open to offers on the remaining buildings and numerous enquiries and potential development opportunities are always explored. Just as urban communities seek out and promote industrial development, the St. John Planning Department for some time has been promoting re-development and renewal of the central core and particularly our preservation area. The area promotion has also been coordinated with the efforts of our tourism department and quite recently our famous Loyalist Trail has been extended to include certain streets of the Preservation Area.

As well as making available for rehabilitation, old historic buildings, at very generous terms I might add, the City should acquire rehabilitate selected buildings for residential purposes. The seed money for such a program should come from the sale of the city buildings to which reference has already been made. This would be similar to what the Heritage Canada Foundation has been doing for some time in other communities and has recently started in St. John. Not only will such endeavours likely prove financial successes to the city, including the generation of additional tax revenues, but more important, it will demonstrate to the private sector that the rehabilitation and renewal does pay. It will also illustrate to the financial institutions that loaning money in older areas can be profitable and that their investments are secure. The day of redlining neighbourhoods merely because of age will hopefully be part of our past.

Finally, a brief comment on the zoning issue: I have already suggested that municipalities will have to be more selective in terms of the types of developments which are permitted in the older areas and which can severely affect the quality of residential living. It very well may be necessary for a municipal council to indicate to an industrial firm that expansion at its existing location is not welcome even though it has been a fine corporate citizen for several decades. On the other hand, the traditional homogeneity of residential neighbourhoods and restrictions of zoning regulations will have to be made more flexible in order to adapt to changing conditions.

It really is too soon to provide a realistic assessment of our renewal program. We really have just started but we are most excited and confident that we are on the right track.

Harold MacDonald:
Chairman of the Winnipeg Housing Rehabilitation Corporation.

Planning for community improvement and housing renewal is what we are talking about in Winnipeg and one thing that can be said about both politics and planning for housing renewal in the '80s and '90s is that none of what we are going to do could have been predicted in the past. There was no universal need that was self-evident and no answer that was self-evident given the instability of those things which planners and politicians have always held to be constant, like the ever increasing gross national product. There are no longer many workable universal programs and you can plan for the future but you have to do it in a different manner, so the planners tell men and I believe it from the way in which we planned for the '70s.

The planning documents for the City of Winnipeg arising in the 1950's and '60s showed a relatively booming metropolis looking forward to a population of 1 million people in the '80s, (we have something under 600,000) enough serviceable land to accommodate large growth, a thriving showplace of a downtown, a diversified and growing economic base, newer and bigger and better suburbs, thruways, overpasses, freeways and underpasses. Unfortunately, or fortunately, depending on how you look at it, reality did not follow the planning process in Winnipeg.

That growth prospective of Winnipeg was one predicted by the long range planners who, in the City's plane of 1966, outlined this kind of city and this kind of growth. That was, for Winnipeg, the end of an age in planning based on growth of that kind.

No one at that time contemplated a drastic reduction in population growth with its attendant results on the distribution of population through the ages. We look at 2 percent per year growth picture in Winnipeg now. No one predicted that Winnipeg would have ended up with a higher percentage of poor housing stock than any other city in Canada. No one would have predicated that. No one would have predicted that the types of dwellings to be constructed in the '80s would shift dramatically or that the overall numbers of new unit construction would drop so rapidly. Nobody predicted that.

In 1977, a process called the Winnipeg Development Plan Review was begun. We were under a by-law to review our development plan every once in a while Winnipeg went along with it because it was funded by the federal and provincial governments. We supplied the staff though and that was a crucial matter because it was an expert staff. I cost over 3/4 of a million dollars and the staff did the review and because of that, they took this unique opportunity to re-evaluate and re-assess basic assumptions and data and methods by which planning was done. They did neighbourhood characteristic surveys — they did income surveys of people, sociological studies, the numbers of single parent families, employment, unemployment, crime and so on in our areas and out of that came a plan which made some of us quite nervous because we were looking at people rather than buildings. We didn't know whether the Winnipeg plan could be repressed or whether it was going to come forward but it did come forward inevitably and it was called Plan Winnipeg and it came in 1980, last year.

Plan Winnipeg is a very thorough plan with policy outlines for almost every aspect of our city and it offered us three options one was called "Business as Usual" option. That meant, just grow like topsy and expand and contract and whatever another was called "Winnipeg West" which was said, we will contain our suburban expansion except in the westward part of the city and the final option was called "The Containment Option" which was said we will now longer expand outwardly but we will do infill housing, look at the core area and try to stop the city from dying from a kind of explosion. Plan Winnipeg favours the containment option. The plan is now in public hearings throughout the city and I have every reason to believe it will be passed. That's part of this strange change of mood. It is a 20 year plan. I expect it will be reduced from 20 years to a five year plan but at any rate, I think it's going to be successful. This new plan, in many ways departs from the 1966 development plan and I've explained briefly why.

Out of this development plan review, or Plan Winnipeg out of this emphasis on older neighbourhoods, came a plan for the revitalization of the older neighbourhoods, principally in the core area. This is one of the studies that was done.

Now that the studies have been done, now that we had the area characterizations published and we could see them, now that the whole question had been raised so publicly by Plan Winnipeg and all the studies that went into it and partly because we hand another problem, namely the relocation of the CPR yards, it became so possible for us to identify not relocation of railyards as the primary issue but the renovation of the core area as the primary political issue. That translation was brought about and Lloyd Axworthy, at the Federal level, Gerry Mercier at the Provincial level and Bill Norry (?) our mayor combined forces and spent a year in camera trying to work it all out.

Actually we did work out joint policies and got the staffs of three levels of government working together and out came something called 'The Core Area Initiatives Program'. We had strategies and we had needs and solutions so they were kind of gathered together in this The Core Area Initiative Program. By virtue of that program, all levels of government will contribute $32 million. How could you turn down a deal like that? So $96 million is now in the kitty for The Core Areal Initiative Program. This program I believe goes beyond the sort of 1970s Plan Winnipeg because it really focuses on people.

The core area program is divided into three sectors: first, employment, housing and neighbourhood revitalization. The second has to do with economic stimulus of businesses; the third is management and consulation.

The first one — employment and housing and neighbourhood revitalization puts housing in the context of a whole approach to persons in the core area because unemployment is one of our chief problems. The program under this sector will encourage people to reside in the core area by giving residents of the area the means by which they can obtain and keep permanent jobs by improving housing as a kind of integral component to the rehabilitation of people and by strengthening their neighbourhoods. Program One will deal with the chief problem facing the core area then which is unemployment. It's goal will be to employ or train up to 3,500 people. The target of this program is to place 3,000 residents with special needs in permanent jobs with an emphaisis on the needs of single parents — young people — individuals of native ancestry and migrating people and refugees. The first substantial program that is being set up is one for a Chinatown project in the core area which will provide housing for the Vietnamese refugees. Some $10 million is involved in that aspect of the program.

The second part of the program is addressed specifically to housing and it utilizes $11.5 million over a five year period. This activity combined with major initiatives by CMHC and the Manitoba Housing and Renewal Corporation will result in the rehabilitation of about 4,000 units and the construction of an additional 400 private homes on in-fill properties. The program has a home repair component, inspection component, a non-profit assistance component and ownership assistance component and a component of assistance for displaced persons because of industrial development.

RRAP will be extended to cover the core area and will be expanded to include a new interest reduction program provided by the Manitoba housing and Renewal Corporation as well as assistance for special needs residents. There will be a co-ordination of inspection and enforcement personnel. There will be an expanded budget, of $1.5 million for non-profit housing — that's for my Corporation.

In addition to the funds provided under the agreement, CMHC is setting aside 500 units for us at 100 a year. Home Ownership Assistance for first buyers in the core area will be provided.

The third program or aspect under the housing program in the core area designed to complement housing initiatives is a rejuvenation of the NIP — CIP. I don't know if you call it CIP elsewhere but the provincial government in Manitoba changed the name but continued the funding for a while but it has new been extended as a component part of the core program of $96 million dollars and I said that, in addition to the continuation of work in the NIP areas, there will be a $6 million grant for areas in the adjacent community. The idea is then to stabilize neighbourhoods surrounding the core area and within it.

'The Home Repair Program' has a target of some 4,00 homes for renovation over the five year period, the RRAP program will be expanded to include an interest write-down feature provided by the provincial government on the RRAP loan. You can write it down to one zero percent interest for home owners and 8 percent interest for landowners. In addition, there will be extra hardship grants of $1,250 which will be piggybacked on the $3,750 amount of forgiveable RRAP loan from CMHC; this is for low income families. The provincial government is putting $7.5 million into this interest write-down program.

There will be an accelerated program of housing inspections conducted by a number of teams including health inspectors, building inspectors, social workers and home maker teachers. You can get some idea of sort of an attempt to renovate people. I don't think that's going to work out quite as we may expect but the attempt is there.

There will also be a home ownership assistance program funded by the provincial government and by the core area which will provide grants up to $5,000. These are grants for the purchase of new homes in the city core for first buyers and which will provide additional tax rebates for a five year period. There will also be an expanded non-profit program in the core area for the more needy people. In addition to this, we will be looking at non-profit housing which is not of a renovating nature but has to do with infill housing downtown and we have a mandate in the Corporation to work at that.

In addition to the housing and renewal package under the core area, there will be necessary economic development, job training and the provision of community services, social service programs as well as neighbourhood renewal programs.

So for Winnipeg, the theme has been classification of our neighbourhoods, government commitment maintenance and renewal incentives. I think it's more than that too, it is really trying to cope with the structures which alienate the people and to try to break through the depressing and debilitating circular process in which needy or alienated people find themselves in our urban centre. This is a plan which looks at people rather than buildings and will have all the ambiguities of such a humane attempt.

Paul Harper:

Director of Community Planning and Development for the City of Thunder Bay, Ontario. Mr. Harper is past president of the Canadian Institute of Planners and a former senior planner in Newfoundland and Saskatchewan.

Residential conversion can be generally defined as the internal alteration of single detached houses into self-contained multiple housing accommodation. This phenomena is not new in Canada. During the post war period with rapid urbanization and the housing shortage, many family homes doubled up. However, this type of conversion activity has recently taken a new significance in the wake of the the several trends which have appeared in our urban society. It is reasonable to assume that residential conversion will play an increasingly important role in the supply of accommodation in certain of our urban areas.

There appear to be four main trends emerging. These are: demographic — we've been faced with a continued sharp decline in the birth rate resulting in fewer children and more older persons in our population structure. Our household size has declined from 3.4 to less than 2.8 in a household. Our studies suggest that the sacred cow of the post war family in their suburban home may not be in much demand in the future.

There's been a renewed interest in living close to downtown. Now you've got to remember, in Thunder Bay, close to downtown would be anything within about 7 blocks because, after that, you are out in the suburbs and it takes at least ten minutes to get home. The cost of gasoline will continue to raise making commuting to and from work, especially in the major centres, more expensive. The strain, both physical and mental, of spending non-productive hours behind the driving wheel has made some people consider the possibility of living closer to the inner city. However, the choice of inner city accommodation is generally limited, in most cases, to high rise type apartments.

At the same time, in the 'inner city' of our cities, there are a good number of large residences which were once the comfortable homes of large families in a earlier era but no longer make economic or demographic sense in the 1980s. Changes in the family life cycle mean that underutilization of living space and increasing cost of maintenance sometime threaten the continued upkeep of these large and often elegant homes. Some of these dwellings have been turnd into rooming houses but they seldom contain the facilities to provide each occupying household with a fully self-contained unit. The next problem, of course, is new housing costs of which I am sure we all are extremely conscious. The cost of new housing as well as mortgage rates are high and these are likely to remain so for the foreseeable future. Some people therefore must look for alternative types of accommodation.

In some cases to maintain their existing homes, some owners may be forced to lease part of their dwellings just to pay for upkeep. Now there's political pressure, which I am sure many of you have found in the last year or two, to reduce municipal spending. So from a municipal point of view, the cost of extending municipal services in to the suburbs to serve new housing development, is becoming more expensive. Faced with the need for fiscal restraint, municipalities must look for ways to increase the efficiency of their existing physical utilities by increasing density within their existing urban structures.

All of these four emerging trends point to a need for re-evaluation of alternative means of accommodation; residential conversion is one such option.

The City of Thunder Bay was created in 1970 by the amalgamation of the two former cities of Fort William and Port Arthur and portions of some rural wards. We ended up with two core areas. The population of the city is approximately 114,000 and the city has experienced a slow growth of about .74 which is politely referred to as "stable growth". There are an estimated 40,000 residential units. Of those 40,000, 70 percent are owner-occupied.

The rental market is very tight, especially for the last two years, and, according to the CMHC rental survey, the vacancy rate has seldom exceeded 1 percent. Another special characteristic of the rental housing sector is that 25 percent of rental units are in single detached buildings. There are very few high rises in the city because development has been dominated in the past by low density spread out suburban homes.

A conversion study was begun in December of 1980 and was completed in May of this year. It is worth noting that the need for this work was partially due to two rezoning applications, both larger homes in older areas of the city. Both owners wanted to convert the buildings into smaller apartment units. The existing zoning on the properties, however, restricted them to only two family occupancy. In recognition of the trends mentioned in the introduction and the anticipation of future conversion applications, the study was commenced to examine the entire conversion activity in the city.

There was another reason. We are almost ready to approve the new official plan for the city of Thunder Bay and the first zoning by-law for the city of Thunder Bay should be finished next spring. Hopefully I will be invited by the Ministry soon to talk on that because I suspect it's going to be the last zoning by-law for a major municipality ever done in ths province because I just don't see how you can afford to do it. Just to give you a hint, the postal rates alone (if we went by what the OMB said) will cost us $236,000. The study was composed of two parts; data collection and analysis of potential role and extent of residential conversion.

Residential conversions are, by nature, hidden inside the building so they are difficult to identify. You certainly can't do it by a windshield operation.

In order to provide any reasonable basis for analysis, the following data was compiled from different sources. Rental types and household characteristics were derived from the 1976 census and from the city rental housing study of 1978. Past and projected housing requirements are taken from the results of a discussion paper on residential development which was done in the city in 1981. The CMHC bi-annual rental vacancy survey provided data on the general rental sector as well as by geographic distribution. Perhaps the most important source of data was from the provincial assessment type data tapes which included a multitude of property and building assessment details. This information helped to identify the present extent of conversion as well as the potential conversion candidates. With data collected, mapping and cross tabulation of properties, an image of present extent of residential conversion developed. An analysis of these details followed along two lines: why promote residential conversion and how much and under what circumstance would we allow it? Well to answer the first question we investigated the potential for conversion and revealed that a substantial body of support for this form of development does, in fact, exist. As for the benefits to the municipality, conversion is a form of development activity which does three things very well. It creates additional units at low construction costs compared with building new units, it increases the number of rental units and apartment units and it increases the life of a very flexible dwelling type. It is also acts as a deferral of demand by providing the next best or closest alternative. Conversion allows construction activity to catch up with demand. Conversion units act as an overflow valve until the temporary surge in population passes or sudden surges are provided for by new construction. Perhaps the most important feature in this adjustment in the housing supply is the quality of reversibility. That's unlikely to happen though, I suspect.

There is a cost saving and an economic role for conversion which have provided additional units with no immediate land or service cost. This is more efficient use of existing infrastructures lowers the per capita cost of services and increases capital investment into the older areas of the city. In these areas, convertions have also generated an increased flow of income through rents and other expenditures of the new tenants which have increased the population density of the area. The increased population may generate a need for additional commercial services or may further improve the utilization of existing services.

One of the things you've really got to watch is to make sure your downtown supermarkets don't close the day before you get into a major rehabilitation program. I think that can be a real danger in some communities. Residential conversion, if done in the controlled manner, will cause minimal disruption to the scale and appearance of the buildings in the neighbourhood. Although not immediately evident there is a change in appearance and the conversion units can cumulatively constitute a sizeable addition to the number and variety of rental dwellings which the city has to offer. These in turn would serve to improve the mix pattern size range and unit flexibility of the housing supply.

The architecture of those larger homes has a scale, construction and charm of a past era and details which cannot be economically reproduced today. These buildings serve as a reminder of the city's heritage and are a asset to the present urban fabric.

There is also the benefit to the new investors. If there is very little new construction, the choice in accommodation relies heavily on the existing housing stock; investment can be less costly with these older homes because many are mortgage free and the owners may be willing to self-finance at at interest rate lower than the rates the developer of new housing would have to charge. In addition, the owner's conversion costs may be replaced by the applicability of various renewal programs that may be available.

A third benefit is to the present home owners. These buildings can be transformed through creation of mulitple units from fixed assets into sources of income which defray the various maintenance costs facing a home owner. In some instances, this may be the only means to carry an expensive mortgage with the help from the rent.

The fourth is the benefit to the tenants. The units in large, old homes converted into mulitple units have even more variety as each unit is different from any other in the building in their size, shape, or orientation. This variety, both on the inside and the outside in large, older dwellings, constitute, the detailing and charm which make many older neighbourhoods so interesting and attractive.

According to to the city's rental survey in 1978, the rents charged in a conversion dwelling was approximately 15 percent less than charged for a similar dwelling in a six or more unit apartment building and these lower rates arise partly from the lower cost of creating the new unit. Further, this type of basic ground-related building also appeals more to families with small children if they have a backyard for the kids to play in.

Now what are the possible affects of conversion? Associated with the bulk benefits are certain costs both to the owner and to the city. The owner is faced with more frequent maintenance repairs higher building insurance premiums, increased tax assessment, other normal increased water, heating, hydro costs as a resulty of those conversions. For the municipality, there's an increase in residential density through the conversion which may necessitate an earlier-than-expected upgrading of local services. The increased population, if sufficiently high, may also put pressure on local services such as education, and recreational facilities. On the other hand, should such increases in population take place in the core areas, it may help to balance the recent decline in population and to justify the continued operation of social services and schools.

Perhaps the most significant effect of increased dwelling units through conversion is the additional parking spaces required. This would aggravate the existing parking difficulties in some neighbourhoods and may create problems in local street traffic and snow removal. I'll return to that in just a moment.

To what extent and under what circumstances should conversion be allowed? Having examined the pros and cons of conversion, we need to address the extent under which conversions would be permitted and this is what we are hoping to do in Thunder Bay. We want conversions mainly because of higher flexibility and cost effectiveness. Many of the storey and a half homes have potential for conversion and we don't want these to be excluded by just requiring a two storey requirement. In newer subdivisions there are larger homes; however, the fragmentation of these units would be premature both for buildings and for the composition of the neighbourhood. Currently in the South Ward — that's the nice, new, polite word for Fort William — 708 cubic meters of liveable space is a minimum requirement for conversion. I had that figure checked three or four times because I couldn't believe it. I wanted to know what would happen if I had a room five feet square and fifty feet high or whatever I need to get my 708 cubic meters. We decided that was cumbersome to administer and unnecessarily large. It appears that in the light of energy conversation and changing lifestyle expectations, a minimum gross flow area of 140 square meters would be acceptable — that's 1500 square feet.

With these objectives in mind, the following controls on further residential conversion activities are recommended in the study. We will only deal with those properties built prior to 1945. Such buildings should be of a height of one and a half storeys or more. The minimum gross floor area should be 140 square meters at the date of the passing of the by-law. To overcome potential parking problems, the following minimum frontage requirements are suggested (we know we are going to have real problems with this) as a guide to the number of converted units in each building: only lots greater than 10 meters — 33 feet in frontage — may have two dwelling units. Any higher number of units shall require a lot frontage of at least 15 meters which is 50 feet. To guarantee an adequate floor area for self-contained units, the following minimum gross floor areas including utilities for the converted dwelling units is suggested: bachelor — 51 square meters (550 square feet); one bedroom — 60 square meters (650 square feet); two bedrooms — 74 square meters (800 square feet); three bedrooms — 84 square meters (900 square feet).

It is hoped that conversions will be encouraged through the following provisions. A parking requirement of one off-street space per unit. At the moment we require an absolute minimum of 1.25 and, as you know, in Thunder Bay, everybody has 1/2 ton trucks, they don't drive cars, so you actually need a fair bit of space. The existing side yard should be allowed to remain and additions to a maximum of 10 percent of the area of the existing building at the date of the passing of the zoning by-law be allowed at the rear or on the top floor of the building provided the required front and rear yards are maintained and a maximum 30 percent lot coverage is not exceeded.

Based on the above criteria, we have identified 1,560 buildings which will be eligible in Thunder Bay. If all 1,560 buildings were converted, each with at least 51 square meters of floor area, this would result in 6,392 units, a potential increase of 4,457 rental units in the city. And this increase would represent 37 percent of the existing rental stock.

City Council has adopted the policies recommended in the conversion study and these policies will be implemented by the following means. It has been included as a policy statement in the city's new Official Plan with the standards and limiting guidelines to identify potential conversion candidates. The zoning by-law will place the street block of these recognized into an R2 Zone. Should any building within such a zone meet the appropriate criteria, the owners can proceed to apply for a building permit for conversion. The intent is to eliminate any lengthy delay which may be caused by re-zoning procedures.

Most municipalities are now faced with a slowing down of new construction. In many cases, it has stopped. Rental vacancy rates are low and the rental market is getting extremely tight. Any practical means to promote the increase in the supply of housing units should be carefully examined. Residential conversion is one practical means of providing additional units. Not only does it provide more efficient use of existing infrastructures, it should also better satisfy the housing needs of a certain population sector. If promoted properly, the benefits that such conversions should bring to a community would more than offset any negative effects that may be felt. The City of Thunder Bay intends to use this method as part of its policy to retain and hopefully even increase the number of residential units surrounding the city's core.

Rupert Dobbin:

Director of Planning and Urban Renewal for the City of Kingston, Ontario. Mr. Dobbin is a former planner in Ottawa and other municipalities.

The City of Kingston is a city of about 62,000 people on the eastern extremity of Lake Ontario. In 1973, it celebrated is tri-centenary. Unfortunately the buildings which composed its origins have all but vanished and are now only little archeological digs in various corners of the city. Most of the buildings in the downtown were constructed in the early 1800s and into the early 1900s. It is sometimes referred to as a limestone city from the large number of limestone buildings both in the CBD and the surrounding areas.

Like many North American communities, Kingston has had a problem it has had to face with the decline of the relative importance of the downtown and the corresponding appearance of decay. Although it's still an active downtown, it was beginning to have the appearance of decaying. In an effort to combat this trend as well as to try and fight suburban shopping centers it was decided to make the CBD a more attractive place, not only for shopping, but as a place for living. Part of this has ben generated by a renewed interest in the downtown — a bit of a panic reflex because of the new shopping centers coming in. Among other things a downtown core committee composed of merchants and members at large has become quite active to try and restimulate the downtown. Beautification, parkette modules along the main street and this type of thing have been received very well.

However, the main point of this little discussion is, how to get people in to the downtown? We feel that there should be more people in the downtown because the services such as sewers, water, gas and streets are already in existence. The commercial and transportation facilities already exist; parking is available. There's six large municipal parking areas in the downtown; entertainment, libraries, hospitals, professional services and underutilized schools are all downtown waiting to be used. We also feel that it's more energy efficient to get people in the downtown so, rather than having them travelling back and forth, they are right where all the facilities are. They can park their car and walk. So the objective became — how to get people into downtown and one of the things we discovered is that there is a lot of vacant commercial space in the downtown — on the second and third floors of buildings. So the question became, how to get people into these areas?

Well, there was no way that we could zone it and say, you've got to make residential in the upstairs and there was no way the municipality has enough money to go and buy it all and expropriate it and build it so we decided to start a program, sort of an incentive, seed money program. To see if the whole concept would fly, we took a survey of owners of all vacant commercial spaces above the first floor in the downtown. There were 126 properties — 20 responses of no interest and 34 said they were interested. Then, looking into a little more detail we found that there was potential for doing 15 and 24 conversions. It doesn't sound like a heck of a lot but the idea is to get it started and get the concept going.

The program began to develop and it was decided the encouragement should take the form of low interest loans at 8 percent, which is a good encouragement these days. The loans are secured through a lien on the property and are repaid, capital and interest, back into the fund. The fund itself is a portion of some acquired or accrued municipal incentive grants of approximately $1 million. The municipal incentive grants collect the interest and have taken a quarter of a million and put it into this program. The program is administered by the city of Kingston. Landlords are eligible for assistance by way of repayable loans. There's now income restrictions on the applicant, except they have to meet some basic criteria. The dwelling should be eligible for federal or provincial funding or heritage funds in many cases. It cannot have received previous federal funding or provincial funding for the conversion of the units and not have received a previous loan for conversion of this unit. It must be on the second floor or higher unless otherwise authorized by the loan approval committee. The dwelling unit must be in the CBD as defined in the official plan.

The assistance takes the form of a maximum of $15,000 per dwelling unit regardless of the size or type and no loan may exceed the actual cost of the work itself. We did put a limit saying a maximum of two dwelling units per landlord and if this works fine, it may be expanded later. We will just have to play it by ear.

Loans are approved by a sub-committee which is appointed by council which review the design plans submitted by the applicant. The repayment of the loan and the interest is simply added on to the tax roll, so we are not having to administer a whole separate program of collections on this. It's just added on to the tax roll and collected by the same means with the same penalties if they don't come up with the money. In case of default, the entire unpaid balance of the loan becomes due as it does if they use the dwelling unit for any other purpose than as a dwelling unit.

For those in Ontario who are interested, it comes under the authority of a by-law passed under Section 248A and 269 of the Municipal Act as well as the Heritage Act. Administration fees are deducted from the amount of the loan to the extent of $600.00 for the first unit and $75.00 for each additional unit created.

The application procedure is a fairly flexible one. The applicant first provides us with the information of where the unit is and what he wants to do and provides us with a sketch. The sketch and other specifications are compared against the building code and the zoning by-law. We then ask him to get two firm estimates from contractors who would be interested in doing the work and this is again compared against the building inspectors estimates to see if he is trying to take us for a ride or whether it is a reasonable application. Information provided by the applicant as to the value of the land and buildings, total area by floors, present indebtedness against the property and the anticipated revenue of the rental property and the operating costs including heating. Then the final application is submitted.

We have run into some problems in this program. It is still an infant program and, like all programs, it has it's problems. One of the things a landlord becomes subject to is additional expenses. Sewers surcharges and parks levies as well as heating. Normally, this above store area is kept very cool. They don't heat it very much during the winter. Now he has to heat it so he has extra costs.

Securits of the units becomes a problem because the entrance way will generally have to be separate from the store downstairs. This causes a problem sometimes. You may very often find the entranceway is now an alleyway, at the back somewhere. This becomes a security problem.

By-law requirements such as parking standards and amenity areas become very difficult. For some of these buildings there is really only one parking spot, if any at all, and there are two or three units.

Some of these old units have been there for 150 years and there is really no amenity area available. The back alleys are either unsuitable or there just isn't room back there, so we are having to go, in many cases, back to the committee of adjustment and say, give them a minor variance. This isn't really a good method to always be going back to the committee of adjustment so we are attempting to get around to having the time to look at the by-laws, amenity area and parking requirements, in the downtown and say, maybe we should be revising them in the CBD area itself to make it perhaps easier to get people in the downtown.

So far, its been fairly successful. It's been four or five weeks now that we've had this program actually in operations. We have five applications for a total of 12 dwelling units. We have received inquiries from several additional ones and we may come up, by the end of the year, with applications which will total 20 to 24 units in the downtown. For a small town, that's not too bad. As I said before, the funds, once they are repaid, go back into the fund system so that it can continue over a period of time and theoretically into perpetuity. The program so far at least has been achieving its objectives. We are getting more people into the CBD. It's being tied into other programs to beautify the downtown. We notice, because of interest in this program and other programs running parallel, the merchants in the downtown are becoming more interested in their downtown. They are sometimes out in front sweeping off the sidewalk themselves in the morning. They are putting out little garbage cans, little park benches and flower pots. We are showing an interest as a municipality. They are showing an interest as residents and owners join the municipality. We feel it is beginning to make the downtown look more alive and lived in and we are just hoping that it will continue.

6 Housing Renewal: Design Issues

Martin Weaver:
Director of Education and Technical Services of the Heritage Canada Foundation. He is past president of the Association for Preservation Technology and he is president of the Institute for Conservation — Canadian Group. He formerly worked for the Historic Buildings Division of the Greater London Council in Great Britain conserving medieval and later other historic buildings.

If we examine the whole art and technology of 'rehab' today in Canada, it becomes distressingly apparent that all is not well. There are two problem areas that can be defined; poor design and what I've termed "aesthetic mayhem", technical blunders resulting from a lack of knowledge of the nature and behaviour of older building materials and systems and the technology of rehabilitation.

Wholesale destruction of original design and construction details is not only wasteful in terms of materials and the original design features, it may also result, for example, in poorer heat and sound insulation performance. Many of the design questions may be subject to argument, of course. Following the recent publication of an article in the Ottawa Citizen, based on Kalman's C.M.H.C. book, "The Sensible Rehabilitation of Older Houses", a member of the public complained bitterly about the article's criticism about the people's decisions on, for example, how to re-fit their front porch with light steel railings instead of the original columns. This is a very, very difficult area for us to get into. Of course, everybody objects to being told that they have lousy taste and of course, taste is a matter of opinion. So I've merely underlined the fact that there is a taste and opinion problem, and I'll go on into more of the technical problems. The technical blunders to which I've referred fall mainly in the following areas; problems associated with insulation and energy conservation retro-fit; paint problems, insects and pest problems and particularly brick and stone masonry cleaning problems.

The Heritage Canada Foundation is trying to tackle the educational problem represented by technical blunders at least, using a four-faceted program aimed at professional architects, building tradesmen and contractors, the universities and the general public. We still do not have a full two year or three year Master's degree program in any Canadian university in the conservation of heritage buildings, which is deplorable. We're doing something about that. The education of the general public, we're trying to do something about that as well. We have co-sponsored a whole series of home restoration seminars, two we've had in Ottawa which have been extremely successful and heavily subscribed. In fact, the first one was oversubscribed. Perhaps one of our most interesting developments is a new series which I'm doing with C.B.C. TV's Marketplace series where we're treating heritage preservation and rehab as a consumer issue.

The rehab really is the consumer issue. The filming of the first half of the C.B.C. series shows the ill-effects of sandblasting. There are other problems, not just related to the technology or the design, but sort of half-way in between: for example, compliance with the building codes. We see an incredible lack of sensitivity in doing this. I would like to think, in closing, that rehab is much more than skin deep. Unless we use all of the structures that have come down to us, or at least the greatest amount possible, then we're really treating our built environment, our built heritage as just a piece of veneer. I think that's the wrong way to go.

QUESTIONS & ANSWERS

CHAIRMAN: Andrew Volgesi, Ontario Association of Architects. I'd like to ask a couple of quick questions. We all know that nostalgia seems to sell and obviously these pseudo-heritage type buildings that seem to be coming on the market as shown in your slides must be a response to the market demand. I would like to ask you, number one, what is the solution as far as producing new buildings that look old or making the old buildings lose their original character? Real estate agents and decorators, by gluing bricks on old recycled bricks, may put buildings into a different age category. Do you have any idea how to prevent this, or is this a natural situation that we have to live with? The second problem is obviously the technical problem. How should the potential buyer of a house safeguard himself and find out if, in fact, technically, the building he buys qualifies to minimal standards, at least?

MR. WEAVER: One of your questions there related to what can be done about the public's attitude towards rehabbing buildings in the old look, the 'heritage' look, if you will. I think this boils down again to an educational problem and I feel very strongly that there is a very, very, very strong responsibility on the part of the architect to enter into public education programs, the same sort of things as the lawyers do, sort of public aid. I think there is a very strong need for this.

As far as the public protection against the unscrupulous vendor who will sell it and get out as fast as he can before the thing either disintegrates or starts to peel, I would like to see two things: better protective legislation to protect the buyer and to protect the vendor in some cases as well. This, of course, means a program of inspection. I think the situation we have now is deplorable and could definitely be improved upon. The other way to get around it is to educate the public once again. If the public are aware that there are certain design criteria, certain technical criteria, they're going to get a better deal in the end either through Better Business Bureau or in other ways. I think that once again the whole thing boils down to education.

QUESTION: Some of us, some poor unfortunates, have made the mistake of having buildings sandblasted. Is there anything you can do about it?

MR. WEAVER: I'm afraid there is no magic Dr. Bondolo's mixture which you can take out of a pot and apply to the surface of the building and everything will be well. In many cases, the problems relate to the destruction of the pointing. At least deal with the pointings and you may considerably extend the life of the brickwork. If the pointing is in good shape and the brickwork is still disintegrating, brush it down first and paint it. Beyond that, I really can't recommend anything for you except perhaps the replacement of very severely damaged brick by other new brick.

QUESTION: Is there any other way of cleaning brick besides sandblasting?

MR. WEAVER: It depends on what's on the brickwork. If the brickwork is simply dirty, then you have a full range of chemical formulations, either acidic cleaners or even detergents or water in some instances will remove the dirt. You simply use the formulation which aims at the dirt itself, or the deposit, and whatever is holding it together. If it's paint that you're trying to remove, use paint remover. They're really not too technically sophisticated. If you have a piece of painted woodwork, or furniture in your house, and you wanted to take the paint off, you wouldn't dream of sending it to a sandblaster, or at least I assume you wouldn't, you'd use a paint remover and that is exactly what you do on the face of a building. If you want guidance on this, drop us a letter at Heritage Canada any time, and we'll give you references, pamphlets on appropriate techniques. Yes, people even send bricks.

There's a problem or a number of problems, in fact, associated with the use of silicone. For those of you who don't know, silicone is a type of transparent coating which has appeared in the last, I suppose, the last ten — fifteen years in Canada, the idea being that they are "waterproofers" or "water-repellants". The theory is that they stop water from coming in from the outside. Unfortunately, if there's any moisture already in the brickwork, and there usually is, and you have a silicone coating on the face, so that water can get entrapped behind the silicone coating and silicone coatings, despite what the manufacturers claim, do not breathe and allow moisture to pass through very easily. They may start off doing it, but then they stop. The moisture trapped behind that coating can in fact cause freezing in the surface of the masonry and then you lose the entire face of the masonry. So you go from bad to worse. It doesn't always happen, but there's a strong possibility that it will. The other problem with silicones is that they don't last more than about five years, they break down. So you've got to go back and do it again.

Peter Gabor:

A partner in the firm of Gabor and Popper Architects in Toronto, he formerly worked in Montreal and has extensive experience in renovation projects. He is Vice Chairman of the Municipal Liaison Committee of the Toronto Home Builders Association Renovation Council.

I would agree there is a need for consumer education. You might be interested to know that, in Ontario, HUDAC is preparing a warranty program similar to new housing for the renovation industry, so the renovators will have to be licensed in the future and there'll be the same kinds of insurance provisions as for new construction. As far as enlightening both the consumer and, I might add, the city officials who oversee construction and the permits, especially in Toronto, we often get involved in heritage situations, within buildings or on the surface of buildings which are required to be changed because of officials requesting them.

We were recently called in to a case where there was a lodging house that had existed for twenty years. This lodging house had been inspected and insured over all these years and there was a new regulation put forward by the city that even though the proprietor was living on the property as of this year, she had to get a license. The city sent down an inspector and found that the beautifully carved mahogany staircase in the centre of the house which served as one of the means of egress in the house had to be covered up. There was a real fight to preserve this. Luckily, she got a good lawyer to represent her at the appeals hearing and, in fact, they did accept some other provisions. She had to close up some of her rooms and fix up the other staircase, but often this is not possible, and a lot of valuable heritage properties are destroyed in this way.

QUESTIONS & ANSWERS

MR. WEAVER: Now, I'd like to come back on that. I'm afraid we see an awful lot of cases like this staircase you've mentioned; it seems to be staircases that suffer very badly. They get destroyed very frequently because not only the building code official is not aware of viable, alternative treatment, the architect isn't aware of viable, alternative treatments, the use of sprinkler systems, voice alarm systems, and things of this nature. We now have coming on to the horizon new provisions within the building code which have been put together on an experimental basis which will present in a codified form, variances which will, in fact, enable people to retain heritage features of this nature. There's a lot more work that needs to be done in this area both on the building code official and the designer.

MR. GABOR: I'd just like to make a passing comment to Mr. Weaver. A lot of the housing renovation situations are not involving architects. You seem to put a lot of onus on the architectural discipline. A lot of them are done by, as I mentioned before, real estate oriented people and just people who have no experience in this field. In the rehab code that's coming up, as you mentioned, (and this is going to be an experimental code) maybe there should be some kind of a stipulation if an architect is not involved. I don't particularly think architects should be involved in all the renovations, but maybe there should be a supervisory body that insures if it's done by the people, it should have some kind of an architectural or technological input.

MR. WEAVER: Perhaps. I've laid a rather heavy onus on the architect. I trained as an architect myself and practised as one. I feel very strongly that the architectural profession is sort of slipping slowly and gently under the waters mainly because the profession is not offering as big and as valuable a service as it should. If the way you can get your house effectively rehabbed and get a really nice result is using the services of an architect, then more people will be going to architects and asking them to do it. I think that there is a need for the provision of a better service.

MR. GABOR: Well, I might say that I don't think there are too many architectural practises that have done enough renovation work that they can give the qualified design advice that you're talking about. I happen to be chairing one of the task forces looking at alternatives to the guideline for the building code. For example, you mentioned sprinklers; we just went through looking at the alternative of using sprinklers and it was, interestingly enough, voted down by a lot of people because they felt that in single family situations, the maintenance requirements for sprinkler systems could not be monitored, and this was not really an alternative. But that's just one aspect.

I would think that the most important aspect or one of the most important aspects in Toronto over the last couple of years, affecting design of renovations, has been the zoning by-law. In our previous sessions, whereas Vancouver seemed to be promoting renovation through zoning by-laws, Toronto seems to be putting up hurdles to make it more difficult. I think this applies both to renovation projects and to situations where you are putting a house in the middle of a neighbourhood rather than developing whole new tracts of land in the suburbs. I've seen, because of the provisions of the by-laws, houses on streets where all the houses are set back five feet. The minimum by-law setback is twenty feet so you have a building that extends far beyond any other house on the street, and in the front, looks like a missing tooth in the streetscape. There are all kinds of very restrictive by-laws that have come up, especially in the last couple of years, and I think really this is an area that has to be examined and pressure put by the preservationists, by the architects, by the developers, to try and get the city to acknowledge that there is a renovation market out there and to make it easier, rather than more difficult. As it is, the zoning legislation that has been passed in Toronto over the last three years, renders almost every building in the city non-conforming to the by-laws. If you want to change a dormer or add a bay window at the front or even demolish part of your building and use the square footage that you have there and apply it somewhere else in your building, you cannot do it without going to the lengthy process of committee of adjustment. Unfortunately sometimes, because of politics, you may not get the variances you need to produce a better design solution.

CHAIRMAN: I'd like to comment again on the rehab code. Mr. Gabor is talking about a specific Toronto situation which is true. We all know that the by-laws and the municipal people are not much help to the renovators. We also know that there's substantial municipal support for preserving heritage buildings and all kinds of bonus situations and negotiations can be taken up with the municipal authorities. It did help architects and developers in the past, and I think this is going to be more intensified in the future.

Don Kerr:
An architect in Oakville, Ontario, Mr. Kerr has been involved in a number of housing renovation projects.

Practical sensitivity is what I think the whole thing is about. My experience, over ten years, in residential work principally, has revolved around two things. The bad news is that it seems to take money to do absolutely anything, and I'm not talking architects' fees. I know a lot of architects who would happily undertake a truly interesting project, probably for the price of the gas to get there, if they could get it done. We're all a bunch of bloody idealists, and we get very little opportunity to do things because the money is not available, the clients are in a hurry, etc., etc.; you know the litany.

The good news is that I really do believe that design excellence can open up what I call by-law "jams". I think if you go into the city, any city, with a scheme where you're going to take the good features, whatever it is you're working with, and enhance them, and add to them, and create something which is obviously an asset to the city and to the people, you're going to find doors open. And if they don't open, you can yell and stamp and phone that Toronto Star thing, and they'll put it in the paper for you.

There is the big question of the difference between restoration and renovation. Every architect gets into renovation. Somebody buys a service station and wants to turn it into a house, and that's renovation.

Restoration, the area that Martin Weaver is in, an area that I get into and am interested in, as I think is any architect who's interested in our heritage, is a lot more complicated. You've got to try and put back enough of what was there that it looks like what it might have looked like when it was done. Sometimes you've got to guess at what it was, and sometimes you look at other examples, but no matter what you do, it's going to cost you a lot of money because we don't have the time and the money to do the things the way they did them originally.

It seems to me there are certain values that are eternal, the stuff we talked about in school, space, mass, form, light, proportions, scale, these things applied. It seems to me also that if you look at a historic building in which you have been asked to put the best possible use for today; retain the good parts of it, usually the good parts of it are the parts that exhibit proportion and scale that are eternal. Maybe they are only eternal within our cultural framework but there are certain things as admired and respected proportions. Those can be retained.

There are in almost every building things that are lousy, including in a lot of old buildings, Often a beautifully facaded building is chopped up inside like a whole bunch of little cages. But it is possible to sort out the garbage and to add the insights we have now, with the experience we have and the examples we can see, and make something that's worthwhile, keeping the old, and adding to it our own insight.

We have all the technical problems of insulation and these solar panels that people like to stick on things. We've got to address all these problems, but I'm saying it can be done, and I'm saying we can get a sympathetic ear from the very people who always seem to stand in the way. But you've got to go at it carefully and sensitively. All we've got to do is try.

QUESTIONS & ANSWERS

QUESTION: Listening to the discussion, I feel called upon to come to the defence of municipal officials, being one of the people who works on putting together zoning by-laws. I'm a city alderman in Kingston, and the dilemna that we face is that we've had a significant problem in our older area with in-fill housing that has been in conformity with existing zoning by-laws but has been a very cheap and ugly form of in-fill housing, primarily to accommodate large numbers of Queen's students in the immediate area of the University. It's made a very serious physical and social impact on old parts of the town and therefore, there's a large outcry from residents of the area. The only tool I know I have is the zoning by-law and amendments to that by-law.

I agree entirely with what Mr. Kerr's just been saying about sensitive rehabilitation, but I face the terrible dilemna of what do I do? Do I write one zoning by-law for the good guys and one zoning by-law for the bad guys? I don't know how to approach that problem. I don't think there would be any complaint about the kind of in-fill that has been undertaken, if it were attractive in-fill. It makes a lot of sense. It makes a lot of sense from the point of view of municipal services and things like that, but it's so incredibly ugly and soul-destroying for the people who live around it. I don't know how to stop it other than through more restrictive zoning by-laws.

MR. WEAVER: Obviously, design excellence is going to be the only solution to your tacky in-fill that you're getting. I would however like to comment on the city in which you live, Kingston having ruined its historical character by what it's done to the waterfront. The buildings which have been erected there must have gone through planning approval. It's interesting; you can have the best by-laws in the world, but if they're not applied properly. That example on the waterfront in Kingston is a gross example to hold up for everybody in the country. We've made this mistake, for God's sake, don't you do it.

MR. GABOR: I think that part of the problem of municipal officials is trying to regulate something that is applicable in one area, and maybe shouldn't be covering the whole city. I think that's what happened here. In Toronto, one house I think was built 180 feet long on a site; it pretty well went from the front to the back and the neighbours got so upset about it that it forced a by-law concerning the depths of buildings that covered the whole of Toronto.

With a lot of the by-laws that have been enacted, the result has been that, if you want to build anything that's reasonably marketable, in certain areas of this city, you have to go to the committee of adjustments. Once you go to the committee of adjustments, then the ratepayers get involved. We will prepare a streetscape to show how the development will blend in to the streetscape, and, often, if you meet with the ratepayers and discuss it with them, there's usually not a problem with the development.

We got involved with one project where a developer had put up a pair of New York styled white semi-detached units in a very traditional setting. This so upset the whole neighbourhood that they started action to prevent the construction of any new housing on the street. We came in with a proposal just at the tail end of this, before the by-law had been enacted, and although we had something that was more in keeping with the neighbourhood in terms of design we really got a backlash against anything that we were doing.

That's really the problem that develops; you pass a by-law and then it's used as a tool for ratepayers to prevent anything happening. That's a danger to people who are living there who might want to expand their property or redevelop it, which is their right, or somebody who wants to buy the property to redevelop it.

CHAIRMAN: The by-laws developed by municipal officials usually are designed in such a way to prevent these uglies to happen. In fact, the by-laws as we know them now, are becoming more and more restrictive, hoping that if you restrict development, then you also restrict the uglies. My comment to that is that the greatest cities in the world have a lot of ugly buildings and I don't think that the municipal officials should be upset about the odd, unpleasant development because it doesn't matter how you do it, you can't legislate the aesthetics of a building.

You can legislate the quality of the environment, maybe, but again in the provincial planning act, Section 35A, as you may know, gives such blank control situation to the municipal officials and planners the hope is that when you do even in-fill development, probably bigger than 1500 — 1600 square foot additions, the planning staff will get involved and hopefully screen these unpleasant situations. There is a terrific onus put on the planning department of the various cities.

MR. WEAVER: We obviously need to identify the resources that we're dealing with and I don't just mean individual buildings, I mean areas, streets, zones of character, conservation zones, if you will, which could have differing levels of protection. In other words, tailoring, just as we were saying, the by-laws to the specific thing you're trying to control with them, not just a blanket approach for the whole of Toronto to cure the problem in one small area. What we should also look at, I think, is the alternative approach to control, the use of incentives, incentives by subsidy, by tax relief, rather than this slamming everybody over the head with a by-law. It's surprising the results that you can get in this way with quite small amounts of money.

If, for example, we say that a certain area in Toronto is an area of character, then say, okay, we're not going to hit you over the head with a by-law, but, we'll give you $500 to assist you in refurbishing that cornice, doing a better paint job, doing a better sawing, something of this nature, some design assistance at the same time, rather like the Main Street program at Heritage Canada. You can get incredibly good results out of that for very, very small investment. I, for one, really applaud the Ontario Government for coming up with such a useful and far-thinking initiative as the B.R.I.C. Program — don't ask me what B.R.I.C. means, it's one of these acronyms that goes along with C.H.I.P. and all the others. But that, I think, is a far more constructive approach — dangle a carrot. It works out to be cheaper, and people like it.

MR. WEAVER: The problem that we really have is that the historic preservation legislation in this country is not sufficiently sophisticated. In fact, in some areas it's antiquated. Some provinces have only just got historic preservation legislation and a lot of us are feeling our way. I think that there's a great deal of room for levels of control, levels of severity, if you will, as applied to historic buildings. Let's come away from this word "historic", nobody agrees where it stops being historic and becomes vintage, and so on and so forth. Let's just say "heritage" buildings.

I think that the by-laws, the municipal laws, provincial laws, need to be much more developed, in depth, so that there is room for an owner of a building which has had the guts ripped out of it twelve times and is really only the spotty remains of what once existed. The owner of that building should not be confronted wit the full force of the law as though he was the owner of Toronto City Hall. Unfortunately, I don't think that in many areas of Canada that level of sophistication exists, and there is certainly a need for it.

CHAIRMAN: The Historical Board, the Heritage Foundation, and Ministry of Culture and Recreation have specific departments with specialists helping the designer and the planning and architectural disciplines. Usually, as it was mentioned before by Mr. Kerr or Mr. Gabor, there's a time factor involved in developing or re-developing or rehabilitating existing buildings and there isn't enough time to do proper research. If it's taken on by the government sector, particularly the municipal government sector, usually there's enough time, but I would also say that Mr. Weaver mentioned that there are new training programs coming up through even the television media, and hopefully the Ministry is going to circulate these new programs to the various design disciplines.

MR. WEAVER: Heritage Canada, in addition to its educational programs, is mounting, and has mounted now for three years, a student design award program. Currently, it's open to students of architecture. In this way we are encouraging architectural students to get into this particular area. We're opening it next year, I hope, to planners as well through the Canadian Institute of Planners so that planning schools will be able to submit schemes. This is one way that we have seen as a very easy and worthwhile way to encourage the development of expertise in this area.

We are also into the mid-career training, or re-training, programs for architects. I have done a program for the Ontario Association of Architects. I've done a similar one in B.C., in Newfoundland, Prince Edward Island, Manitoba, and this coming year we'll be working in Alberta and Saskatchewan, and probably coming back down to Ontario again. So there are really those two aspects and we are encouraging the universities themselves to open up new programs. The University of Calgary is a good example. They have a school of environmental design. The professor in charge of the program has strong leanings toward historical preservation needs, he's a planner. I think that the responses and excellence of Canadian programs are very much dependent upon the expertise of usually one key individual, but that's the way all these things start anyway. Heritage Canada is discussing the whole concept of co-operation between Canadian universities so that a group of universities can come together and offer, as a group, the various components of a major course. To set up a Master's degree program, or even better than that, a Ph.D. level program in a Canadian university these days is incredibly expensive, but what we are looking at is a possibility of getting a group of universities to work together, pool resources, move people around, have a mobile faculty, be a university without walls, if you like, so that we can achieve the result within a more reasonable budget.

MR. GABOR: I think you, Martin, are talking about educating the design professional. I think hand in hand with that you have to educate the public. It's very difficult for an architect or a designer to convince a client to do something that's going to cost him money, if he doesn't appreciate that this is what should be done, and it would, in fact, enhance his building. It's sometimes a factor that there's not enough time or money or a lack of sensitivity on the part of the owner or developer. As opposed to that, you could choose better designers who are more sympathetic.

MR. WEAVER: The public education is critical, and we're certainly addressing it, but the trouble is, we have limited funds and limited number of staff to do it. And as you can see, we're sort of stretched across the country and trying to operate on a large number of levels at once.

MR. GABOR: In some respects, this comes back to public education. If the population is aroused enough, there are certainly precedents where, for specific projects, money has been raised from the community to do certain work. In this case, what you would be doing, I suppose, is helping a private enterprise do work which he should be doing through public funds. But if that is the only way that a building could be saved, then maybe that's one option that has to be looked at.

QUESTION: The comments that have been made seem to be addressing rehab in what I may call a comprehensive way, and I think that's fairly desirable, but also very costly. What about the owners who can't afford to do comprehensive rehabilitation and must get involved in only doing partial rehab? Do you have any suggestions on ways of doing partial rehab in a sensible world?

MR. WEAVER: I mentioned earlier the home rehab or home restoration seminars which we co-sponsored in Ottawa, and in Winnipeg. We've done one here as well, in Toronto. We can assist in the education of the homeowner so that he can do a reasonable quality job himself within his own means and at the speed at which he can afford it, which is getting increasingly difficult these days. But again, it's a public education question. We're attempting to address it through those seminars. Because seminars are quite difficult to put on and take a lot of resources, we're addressing it through this new television series, and if the C.B.C.'s first programs are successful, then I think we'll go to public television and try and encourage them to do a major program there.

MR. WEAVER: We feel very, very strongly at Heritage Canada that you should not be just keeping the facade. You should be taking a critical look at the rest of the structure as well. There was a very interesting case a year or so ago in Ottawa where the Ottawa Citizen newspaper bought a house dating back to just before the turn of the century. With a great deal of bugle blowing, and all the rest of it, they said that they were going to do a rehab job on this. It was going to be the cat's meow. And everybody was going to look at it week by week in the newspaper. The first thing they did was to gut the interior. And then they said well, well, well, who'd have guessed it — this is a brick veneer building over a wood frame. Anybody who knew anything about rehab or about old building construction could have told them that before they even started. By the time they finished the job at a cost of $185,000 or something like that, it was a mess, and they found it very difficult to sell. The question really is that they did not look at the resource; they didn't understand what they had and they didn't take advantage of the resource.

The tendency to regard historic buildings or heritage buildings as simply a facade with expendable material behind it, is lamentable and stupid. In these days of energy conservation and conservation of resources, we can't afford to keep doing it. We've got to retain the maximum amount possible. There's no reason for throwing away miles and miles and miles of excellent quality lumber from the inside of the building simply because it's in partitions which don't fit in with the open plan ethic. If you insist upon having open plans, I suggest you look again. Basically, use the resource to its maximum advantage and don't waste it.

MR. GABOR: I would agree but sometimes you can use what's there, and sometimes you can't. I have felt the same frustration when we come up against an historical building sometimes, and what's behind the facade sometimes is more worthwhile than the facade yet what we're forced to retain is the street facade. We're allowed to do whatever we want in the interior. There's one particular house that I was involved in that had a beautiful two-story living room. The house was built for an artist. It was a very unique home yet, while it was designated, the developer wanted to subdivide the home to make it a modern home on the interior. And so you have a modern home on the interior, and the facade is preserved but I don't think that really is the essence of what we want in preserving our heritage buildings. Stronger legislation has to empower the preservation boards to be able to act in this kind of situation.

MR. WEAVER: I don't think that stronger legislation is really the answer. In fact, I'm sure it isn't. The attitude should come from the owners, from the public, from the designer. They shouldn't have to be threatened by a municipal official every time they want to work on a building.

CHAIRMAN: I would say there is a major difference when we're talking residential historical building or a commercial historical building. I don't know, Martin, if you're talking mostly residential buildings, but I would say this much; that whenever we faced a commercial building that had historical merit from a streetscape point of view, I would have a tendency of disagreeing with preserving whatever the interior is. I'm talking now in general terms because from a code point of view and a functional point of view, we found it's almost impossible to accommodate the new uses. In the commercial sense we managed to do a good job preserving the building and yet totally readjusting the interiors to accommodate the new use.

7 Present & Future Lifestyles: How Will They Affect Housing Renovation & Energy Conservation

Dr. Robert Logan:

Associate Professor of Physics at the University of Toronto, Dr. Logan is co-ordinator of the culture and technology seminars begun by the late Dr. Marshall McLuhan in 1946. He is a member of the Canadian Association for the Club of Rome.

Being a futurist, I'm going to look at the past, because the only way to look into the future is through the rearview window to see where you've been. I'm sure concerned with the intellectual lifestyles. There was a time when energy conversation and renovation were not a problem. People lived in an organic way — close to nature. The cave was considered a high-rise condominum. People made do with what was there in nature. It was a time before writing, it was a time before agriculture. The forms of our houses were natural — they blended in with what was there. No straight lines. Then came progress.

The first progress was developing a food supply on the same plot of ground one could live off and with that began civilization. When you plant things, you plant things in a straight line. That way of thinking, that linear way of thinking, had all kinds of implications. For example, housing began to take on linear qualities. Probably the most fascinating shape to people who live in a preliterate society is the straight edge of this lecturn. When colonial authorities put up signs that related to people. They'd never looked at what was on the sign — they were just completely taken in by the shape of the sign, the fact that there were square edges. That, for them, was magical. There then developed with civilization what one may call an artificial way of living, based on the notion of straight lines. Development went on, with writing, again, straight lines, influenced perhaps by the irrigation ditches which had to be built along straight lines in order to irrigate the crops. In fact, the Greeks, when they first wrote, wrote from left to right and back again and they called the writing bostian which meant ox-plowing.

Our technologies influenced the way in which we live, the way in which we do things. As we began developing writing, we also developed a way of classifying and a way of organizing and systematizing our information, and there developed science. That was the beginning of our problem, because, with science, man began to develop the haughty attitude that he could control nature — that he was in charge of the system. A reversal took place.

Instead of living with nature, man began to think of overcoming nature, overpowering nature. It's also reinforced by some of the things that he wrote to himself. In Genesis, it talks about how man will have dominion over the earth, over things that creep about, and there developed in mankind a certain hubrus.

Well, the story of science you learned about that in school. And you know that science has been a fantastically successful enterprise, it has brought us all kinds of progress, comfort. I'm sure not being a physicist, I'm not against science, I'm not against the progress that science wrought. Life is much simpler and much easier and comfortable and more richer and fuller and more wonderful because of science. Better living through chemistry. However, it has brought us to a way of thinking and a way of doing things that might turn against us, and bring about our downfall.

A change has been forced upon us because science went so far and brought us along a linear path of development that could only go so far. We're beginning to understand now that it's beginning to work against us, and looking back into the past as we begin to plan the future, a yearning to get once again in touch with some of the good things that were happening in the days of pre-literacy when we were hunters and gatherers.

Marshall McLuhan would attribute this to the fact that we've gone from an age of literacy, in which all our information was laid out for us in linear form, which promoted a linear way of thinking to the new way in which we receive information, which is both orally and visually through electronic media. He believed that this new way in which we receive information shrinks the earth that we live on, shrinks the globe, produces a global village mentality in which we're forced to see the new patterns that we're living in. As speed of information increases, new patterns begin to appear and one begins to look globally, to look at the holistic picture. This is a position that is beginning to emerge. We're now returning to organic forms. The square shape and corners and straight lines are giving way to organic forms and shape. The first dwellings of mankind were usually what they call now the "open plan". There was one room; one didn't divide up one's dwelling into little compartments. We're moving back to that way of living. The old is coming back to us once again and haunting us and becoming our inspiration for the future. That will be reflected in the ways we live.

There's also the question of how we organize our technologies — how we organize our scientific knowledge. We are now beginning to think in terms of what the long-term affects of that kind of planing will be. We've reached the stage where progress does not always increase out comfort. We're begining to understand that we must look at the larger picture and that is changing the way in which scientists and designers are planning the dwellings of the future.

A nuclear physicist at Princeton University has developed a new scheme for air conditioning a twenty million dollar office building. Rather than doing it with air conditioning, which is a tremendous drain on our energy resources right now, making use of electricity, he's planning to build a mountain of 5,000 tons of snow in the wintertime when it's easy to make snow, to take his 5,000 ton mountain of snow and cover it with light, vinyl plastic and let it sit there unit the summertime when it's warm. He'll run pipes from his mountain of snow into an air conditioning system in the building and use the melting ice water as a way of cooling off his building.

So what is developing is a new trend among scientists and engineers to work with nature instead of working against nature. I think that's the important point that I wish to stress, that in terms of scientific, intellectual lifestyles, the movement is towards being in tune with nature and trying to work with nature instead of working against nature.

That is a trend that is developing in housing as well. People are trying to let the sun shine in, to make use of that energy that usually bounced off the opaque walls of their building wasting the energy that could be used to light their home and to give it warmth.

Neal Peirce:

A founder and presently Chief Contributing Editor of the National Journal, Mr. Peirce is a columnist syndicated in more than 150 newspapers, writing on state and local government themes and federal relations. He is also an author of nine books on people, politics and power and their actions and use in the 50 states of the United States.

I think most of North Americans, when they view the housing and the general urban development and planning patterns in Europe, find it difficult not to come away with something of a sense of admiration and often envy. Certainly, those of us from the United States have questioned ourselves long and hard about why we have fallen so far behind the Europeans in creating attractive and lively cities, preventing the spread of slums, conserving landscape, creating compact and rational forms of housing and urban develoment?

Land use practises in fact illustrate the sharp division between the American and the European custom as dramatically as anything else. You need only fly over a sample of cities in both continents to see the difference. In Europe, you see those cities are sharply defined. At some abrupt point, the urban settlement stops, and the green-fields and the forests start. The same is usually true of the small village — here exactly is the village outside of the fields.

But in North America, urban settlement is very often like a great hazy smudge on the landscape seen from the air. The centre city you can usually make out, great big monuments made by businessmen to themselves, but you have no idea where the city really stops, because it just dribbles out. The patterns of strip and leapfrog development go far out into the surrounding countryside and sometimes then, of course, the cities just blur together.

Geography and history account for a lot of this difference. Europe, with a population density that's ten times that of the United States, and maybe a hundred times that of Canada simply couldn't afford any kind of spread development pattern. The United States and Canada, still imbued as they are with a frontier philosophy, have believed much more in the unfettered private right to the use of property and they've been generally politically unprepared to impose controls on the use of land.

To North American eyes, the amount of personal space within the typical dwelling unit of a European is small, much smaller than that to which we're accustomed. When you look closely, though, you discover that while people live in close quarters, they appear to live well, and the quality of those quarters is pretty high. The explanation of being able to get along so close together is that, for centuries, given the number of poeple and the physical constriction of Europe, they've had to. They've had to find a way to resolve their social and personal problems through a co-operative spirit, and it's been pretty easy in North America just to use space as your cushion agains other people.

The spatial explanation, I suppose, does not adequately or wholly explain the difference between the continents, but goes a long way. If you visit West Germany or the Netherlands or the United Kingdom or France or Scandinavia, you will detect the strong role of central planning, a real cultural acceptance of authority, a cohesion in the body politic which is rare, if ever, found in the United States, where localism tends to be very dominant in decision-making. Canada, maybe, lies between the two extremes. In addition, the private sector continues to play a much stronger role here than in Europe despite the hardy growth of government in North America. Yet, I wonder if the acceptance of planning and authority isn't also related to part to the physical circumstances.

I have a quotation here from Kenneth Orsku, who's the Vice-President of the German Marshall Fund of the United States. He notes, "one of the keys to maintaining thriving and prosperous cities is to make them attractive to those who live and work there. Europeans who, until recently, have had only limited options to live extra-muris, outside the walls, have cultivated throughout the centuries the art of making their cities liveable through the care of their parks, solicitous treatment of pedestrians, convenient public transportation, intelligent management of open spaces, sensitive urban design, attractive landscaping, and meticulous attention to street cleaning. Our tendency in America is to flee the city as soon as we've been able to afford it, rather than to create a liveable and attractive environment in the city. Only now are we rediscovering the pleasures of urbanity and making serious efforts to enhance the quality of urban living."

There is, of course, a down-side to the European planning controls that you need to be honest about. These controls tend to be time-consuming and restrictive. Lord Goodman has said of the British system which the American urbanists admire so much that "we have a planning system that would have made the Ottoman Empire drool with envy". William Riley of the Conservation Foundation notes "an encounter with the planning bureaucrats in Britain or Germany requires great patience and perserverance". They can get away with murder, even when they say 'yes' to a rehabilitation for a townhouse, for instance, it may take them months. Frequently, they will say 'no', not because they suspect you intend something else like taking in vacation roomers even though you say you really want to expand your home for a growing family. They have facade controls, tree preservation orders, registration of hedge rows, regulations of the interior alterations, prohibitions against using certain colours of paint and on and on.

Behind all of that, however, there does lie a more positive doctrine. The concept is stated in German law that "any reasonable and economically oriented person would acknowledge values of beauty, history, and ecology that his land may carry with it". Non-urbanized land in Germany lies within the "Aussenbereicht", the outer zone: it's to be held development-free under very exceptional circumstances.

I can't speak for Canada, but I'm sure that we need, in the United States at least, to develop a kind of judicial concept of the social obligations that come along with land ownership including acceptance of rules against developing it even when that seems to be government taking the value of the land as we might otherwise be able to develop it.

However, there's another side of the coin, the positive responsibility of the public sector to find and make available for development land in the "Innenbereicht", the areas inside that are designated for urban development.

Certainly Europe has made most strongly this effort to actually facilitate development. West Germany, for instance, is an extreme example. At least half of its housing stock was ruined at the end of World War II. Germans soon faced what were to become twelve million refugees from the East looking for housing. They had a rural to urban migration involving millions of people and, in later years, they had the arrival of several million guest workers from Southern Europe. Easily they could have had, as the order of the day, build anywhere, anyhow just to get the housing up, but it wasn't that way. The new housing had to be in the "Innenbereicht" or in land directly adjacent to it. Ohterwise, they really could have had suburbs sprawling from Dusseldorf to Stuttgart, from Munich to Milan.

Similar policies applied in the Netherlands. To Americans concerned with controlling urban growth, the lessons of these kinds of experiences in Europe would seem to be this; that land conservation as is traditionally pursued, at least in the United States, where you punch holes sort of in a map and say "ye shall not go there" is not a sufficient way to respond to a dynamic need in the society for development. Rather, you need some kind of a comprehensive planning process which says not only, 'no, not here', but also, 'yes, here', and 'here's how we'll make it possible for that development to go ahead'.

The happy implications of Europe's land use in housing design controls are, of course, very falicitous for energy conservation in housing. Compact housing, with common walls, less interior space and careful building construction standards, adds up to greatly enhanced energy savings. The fact that land use controls keep housing units closer together means that mass transportation is practical and reliance on the gluttonous private car for daily commuting is less necessary.

The automobile, of course, is popular in Europe as it is popular everywhere in the world where people can get their hands on it. There have been very rapid rises in Europe in automobile ownership as affluence is increased in the society. Of course, they have had the nice things that come along with it; the roaring, smoke-filled alleys known as freeways, going through their cities, the real denigration of the quality of life in many neighbourhoods and that tranquility of small towns destroyed by the invading steel monsters. But the Europeans here again seemed to have gotten some handle on the problem earlier than we have. Pedestrian malls so far attempted fairly timidly in North America are now really the rule rather than the exception in the centre city precincts of Germany and Austria. And they also are found in abundance in Scandanavia, Italy, Great Britain and the Netherlands.

Now Europe is pressing on with ways to tame the automobile and the residential area, not by banning it altogether as you would in the pedestrian zone in the centre of the city, but by forcing it rather to move at a pedestrian's pace on many residential streets and to coexist with, rather than subjugate, children, old people or byclists, others who want to use the streets. The unique European contribution is best shown in Dutch neighbourhoods where there are "quiet, traffic zones". They use many shapes of brick and cobblestone laid down in an ingenious pattern to guide the automobiles and the pedestrians alike and all of this ends up in these quieter residential streets creating a soft and humane enviroment in which a racing automobile would be about as much in place as a child playing on a freeway.

There are, of course, some finer sections in European cities and some less fine sections. You can find a handful of festering slums in Naples, Paris, Glasgow, Liverpool, Manchester and Birmingham. The English have a special problem with this and there are probably more slums in the making in the West Indian neighbourhoods of London and Paris's north African quarters and the Turkish and Yugoslav areas of Frankfurt. Comparatively speaking, you find substantially fewer slums in Europe than in America.

One reason I guess is that there has been a long history of residential integration. People simply have taken it for granted that people of lofty standing and those of limited status, those of high and low income, can and should live in close proximity to each other. You will go very often to visit a very famous person in Europe (I remember visiting the urban planner, Victor Gruen about three or four years ago) and the outside of the building will be plain and dull. You go inside and he, for instance, would have a very spacious apartment but downstairs you would see some very modest apartments and then there might be a very inexpensive 'bistro' or restaurant on the ground floor. You find everything mixed within structures both in terms of residential profile of income and other kinds of facilities.

Another reason I think there are fewer slums in Europe is that such countries as Germany and Britain have acquired large new apartment complexes. When they are constructed with any form of government aid they include some percentage of social housing which is the European term for subsidized housing for the poor. Another very important European custom in the housing field which I understand is beginning in Canada too, is the mutual housing association or co-operative. In Europe, those organizations go back many decades and, in some cases, they go back for centuries. They offer a form of housing development that is something more public than the private housing forms so dominant in North America yet more private than public housing, at least as we use that term in the United States.

In Germany, where it's common for most private houses to sell for something like a quarter of a million dollars on the private market — the non-profit mutual housing approach is a real necessity. It is estimated that more than 60 percent of the population in Germany qualifies for some form of assisted housing. That country now has more than 1,800 non-profit housing corporations which have accounted for construction of about for and a half million dwelling units since 1948. Many of these German non-profit housing groups were organized initially by trade unions just to help out the poor but then, as they were reorganized after World War II, they expanded their scope for middle income people as well.

The Netherlands has housing associations also although in Holland, they seem to be more tightly controlled by the Government than they are in Germany. In Holland, Government constructs about 30 percent of the housing.

Finally, in Britain, government has been moving away recently from a policy of large blocks of heavily subsidized public housing to a program that encourages nonprofit associations and co-operatives with substantially less cost than government built housing. These non-profit associations in Britain have been producing about 40,000 units a year. It's a young movement and it attracts many young and enthusiastic professionals who wouldn't be caught dead working for a government bureaucracy in England.

Housing expert, Steven Bloomfield, who recently surveyed the European non-profits, cautioned that nonprofit housing does not mean amateur housing. Too often, in the United States he notes, co-operatives and non-profit housing associations have been managed by persons with relatively little professional housing experience. One must attribute much of the success of the European housing programs to the fact they are highly professional organizations run by well trained personnel. In Europe, non-profit housing is a serious business. There is as much concern about balance sheets and productivity schedules as there would be for any profit corporations.

Finally, it's clear that in Europe for housing you are using the plan of a mutual housing approach as a coordinative part of over-all urban development. It doesn't stand alone. You can't just by different forms such as arrangements for property ownership or tenancy, change the condition of how housing is going to be; it has to be related to overall physical and social planning.

An area in which one finds more similarity between Europe and North America is that of housing preservation. On both continents, we have witnessed during the 70's and, of course, still today, a strong movement to favour renovation and modernization over new construction. It was heavily underlined in the introductory film this morning and most particularly, to protect the demolition of individual houses or even entire city sections of distinguished architecture. The movement has been a reaction against moderistic architecture and this very character-less form of contemporary housing and office building construction. Europeans just hate the large high-rises. I understand there's some of those same feelings here in this city. It's fueled also by fear of destruction of more historic buildings in neighbourhood and negative feelings about government deciding from a planner's office just how housing for the poor and middle class should be.

Often there is a price to pay, however, for saving a low income neighbourhood thru renovation. Middle to upper income persons move into the housing that was previously occupied by low income people. This is the so-called displacement or justification phenomenon which I noted with interest has been detected in Toronto for instance ever since the 1970's. Using the word 'gentrification' meaning the gentry moving back in, we didn't pick it up in the United States until about 1977 but Europe knew the story well and earlier. Greater London has been losing about 100,000 people a year as the gentry move into such areas as Greenwich, Kentish town and Fulham. The affluent new houses in effect evict the blue collar tenants who have many more persons per dwelling unit.

Paris, reflecting the same phenomenon, has lost a half million people in the past two decades. Today, with two and a half million people, the Paris area has no more population than the city had in 1880. Not every nice old district has been preserved either. As Francois Dupuis reported for Neuvelle Observateur, entire districts, once composed of little restaurants and shopping have been razed in order to construct skyscrapers so that the formerly graceful horizon of this city of Paris has become as angular as that of Manhattan. Meanwhile, he notes, in sections of Paris that were deemed special historic interests have been preserved but their ancient buildings have been remodeled and put on the market with outrageous price tags. A startling effect of this of course is to empty Paris of its middle class citizens who can't afford the new prices. As rent controls are lifted progressively over the next few years, the fear is that we will have a Paris that is beautifully renovated, very chique with nice shops and good housing but no place for the poor or the middle class. In the meantime, North American styled suburbs have mushroomed around Paris and some people think they are the wave of the future there. This is a sure clue that, without good luck, Europe's compact land use and energy conservation could be lost.

Bill Riley, the conservationist was warning, as early as several years ago, he had a suspicion Europe was about to confront these same powerful forces so long familiar in the United States where you have many newly affluent people with cars, a taste for living on the ground floor with a garden, a willingness to commute to work by car, an acceptance of shopping centres, or, as the British call them, hyper-markets. The centre city then is given over to children, the well-to-do and perhaps a scattering in a bad precints of the foreign born poor. It looks as if that prediction is beginning to come true.

In the meantime, something even less welcome has happened to the European cities that you may have read about recently, riots, in such affluent countries as West

Germany and Switzerland and the Netherlands, sparked chiefly by the shortage of affordable housing for younger people. The youth, to be sure, are also protesting against what you might call this conformist, comfortable character of the northern European countries but if you look behind it, you will usually find housing and years of rent controls that depress buildings. Rampant housing construction, including the purchase of residences that turn into parking lots of office structures, appears to accentuate the shortages.

Perhaps the most critical situation is the Netherlands where the housing ministry says there's a shortage of 109,000 units, half of those in Amsterdam alone. On top of all that, the squatter movement has formed. The most serious are in the older working class sections of Berlin and in Holland. The best to organize squatter movement in fact is Holland where more than 10,000 people are now squatting in some 5,000 Amsterdam buildings and somehow resisting the efforts of the authorities to throw them out. It may be that squatting will become the 1980's equivalent of a violent leftist protest of the 1960's. We can say, in summation, that despite all their progressive and thoughtful policies, the Europeans do have serious housing problems. They are problems that are not likely to go away very soon. In the meantime, they are experiencing some of the same pressures we felt in the North American housing market. The average size of new housing in the United States peaked in 1978 at 142 square metres or about about 1,500 square feet and dropped 6 percent in the next two years. Apparently it is still going down. The World Watch Institute reports similar trends emerging in Sweden, Canada, as well as other countries which really marks an interesting decline for the first time in housing quality in the industrialized nation.

We are looking to a picture where in the United States, housing might cost on an average $150,000 by the end of this decade and there's a suggestion that the single family, free-standing home is a peculiar development based on a unique combination of cheap capital, energy, land and materials, a rare combination that has only happened in the industrialized countries and not likely to be seen elsewhere in the world even if George Gallop's polls show that this is what most people would like to have.

'Partners of the opposite sex' sharing living quarters, which means of course, not married, have tripled in the United States in the last decade. Of course there are more elderly folk living alone with greater longevity. Well, all this means to me is that rational policy, whether in Europe or on this side of the Atlantic may expect smaller, more compact housing units regardless of the polls. Those housing units are likely to be closer together physically too, except in the outlying areas where both Canada and the United States have this new and strange phenomenon for the 20th century of some kind of a return to the land happening.

It seems that there may be a split with the U.S. and Europe on one side and Canada on the other in regard to growth and demand. Demand is extraordinarily strong and getting stronger in Europe and the United States for housing for all the demographic reasons we have been hearing about although the Canadian projection is for somewhat a less strong growth. But even here in Canada, it would seem to me that the market restraints created by high interest rates could quickly build a reservoir of strong demand and thus duplicate the problems in housing that are being felt in Europe and in the whole industralized world, not to mention the ferocious pressures for housing in the less developed countries.

Sally Lerner:
Professor in the Department of Man — Environment Studies, University of Waterloo, Ontario.

Over the period of the next 25 to 50 years, the transition we must make is from a society based on non-renewable energy sources to one based on a mix of renewables having a potential for being sustainable. Involved in this transition are economic constraints and uncertainties that are currently most clearly exemplified in the high interest rates, taxpayer revolts, stubborn unemployment and in the U.S., Reagan's very interesting 'you tighten your belt' approach to financial complexities.

Now, 'synergy', as the dictionary reveals, refers to the combined co-operative action of two or more agents which, because this action is combined in co-operatives, increases the effectiveness of each agent and enhances the outcome of the action. If that sounds a bit cumbersome to you, what it really means is that anything that is related to synergy or that is synergetic is something that becomes more than the sum of the parts and essentially that's what we mean when we talk about synergy.

Future lifestyles which we can see evolving in the present, will require more synergetic planners and interaction in order for people to maintain a sense of control and confidence and indeed even for many people to stay afloat and avoid extreme downward mobility. This will be true for different groups in society and for different reasons.

One group we sometimes think of as very vulnerable is the elderly which will be increasing in number. There will clearly be a growing need to develop better material and emotional support systems for this group. Social planning in the traditional welfare sense is not going to be the whole answer or perhaps even the best answer either materially or affectionally and funding for such traditional welfare efforts is rapidly drying up in a south to north direction anyway. We will see, in some examples that I am going to talk about later, what I've called synergetic planning. For example links between the elderly and other parts of the community and among the elderly themselves, constitute a necessary and desirable trend for the near future and the same considerations apply to other vulnerable groups such as the poor, the young and those who are ill-equipped to survive in a highly competitive environment.

The working and middle class majority, while they are less vulnerable, will be faced with rising food, housing and energy costs with those same high interest rates and also with rather uncertain employment in traditional blue and white collar occupations. They will need to be doing more in terms of combining efforts to educate their children, to look after their parents, to provide for a decent retirement for themselves and indeed, to upgrade their own job skills in the face of this rapidly changing job market and rapidly changing technology. Therefore, for this majority, this synergetic activity affords a means of maintaining security, self-respect and a sense of control in an era which is going to involve increasing high technology, diminishing resources and extreme uncertainty in many people's lives, even of people who are not used to experiencing those kinds of stresses.

There are many lifestyle innovations and it's interesting to hear of what's going on in Europe because some of the things I'm going to talk about have been foreshadowed by the European initiatives but somehow North America had developed it's own versions of some of these.

Many lifestyle innovations that I am going to talk about have, until recently, been looked on as counter culture. Increasingly though, we will see and we are seeing a broadly based turn to experimentation with more functional lifestyles.

I would argue to this group that the need for some rethinking of our habitats and what they should be like and how they are designed and what sorts of social arrangements they could be tailored to and designed for. These lifestyles will be more synergetic, that is, combining resources for more positive outcome. They will be more synergetic in terms of social arrangements and will require suitable habitat and congruence, that is, a good fit between the social and design elements that will be one of the basic criteria of suitability of dwellings and so forth for the future.

For the remainder of the paper, I wanted to suggest some of the possibilities and opportunities presented by the situation that I've outlined and-to offer some examples of synergetic activities at various levels of scale. While the focus will be on housing and energy, you will note that other basic human needs are involved and are met in a variety of ways. That's essentially what synergy is all about. Don't plan to do just one thing if you can use the same resources, human and otherwise, to do more than one thing.

To begin, lets's face the very current problem of which all Torontonians are painfully aware, which is finding a suitable place to live at an affordable price. Several interesting solutions to that problem are currently in operation. Each has positive and negative aspects. Each is more suitable for some people that for others and each suggests new directions for renovators, planners and local government people. The first solution I would like to discuss is one that I find extremely interesting because it's very old in many ways and yet there are some very interesting new twists. It's called 'house sharing'. This is hardly a startling innovation. You will recognize it if you've ever had a roommate or a poor relative or you've been a poor relative or joined other students to rent a place to live during college. What is new is, first, the spread of this practice among relatively affluent adults who want amenities they can't afford individually. They may be along the lines of a coloured television or a really super stereo or whatever.

Secondly, we see a very synergetic approach to matching house mates with complimentary strengths and weaknesses. An outfit called "Operation Match" in Montgomery County, Maryland is a good example of this kind of approach. There's a publication called 'Neighbourhood Idea's that describes this and Operation Match is seen as a viable, cost effective way to provide inexpensive housing through better utilization of existing housing space. That's an important thought in a number of these new approaches, really taking existing housing stock and making it go further. The program serves as a clearing house. It's simplicity is just marvellous and the cost is virtually nothing. The program serves as a clearing house linking those who offer space to those who seek housing. The article goes on to say "for home seekers, there are various options". Some pay rent monthly, others barter their help in the home for room, sometimes board and salary for those providing the home. Sharing can mean extra income to meet rising expenses Many elderly are in this position: large house, rising expenses, fixed income, or to provide services that the home possesser couldn't get otherwise: care for the children, care for oneself if one is old or becoming physically handicapped and so forth.

There are programs like this which are concrete examples, at least three or four that I know of and there are probably a lot more. The staff of the project, if you have a staff, get these people together and they provide screening of applicants, inspection of housing, and I think, quite importantly, ongoing counselling to ensure appropriate matches. Obviously, even marriages are not made in heaven. Unattached sharing has its difficulties and to have an ongoing staff that can deal with those kinds of problems makes these things go and they are going.

There are stats to show what they have done. Those best served by the program are low income single people, single parents, those in need of short term housing during some sort of transition: divorce, halfway-house kind of thing, and the elderly and the handicapped. It's interesting that the researchers who have evaluated these programs point out for the latter two groups, the elderly and the handicapped, the house sharing arrangement is often the only alternative to really counterproductive institutionalization.

Now, if you look at these two variations of house sharing, what ideas are suggested, you might ask, about renovation? Where does that all fit in. We are focusing on renovation rather than new construction but I think frankly that this applies to both. What ideas does this suggest to create a better fit between habitat and the lifestyles of people living in them? The first example, sharing by these affluent adult amenity seekers might suggest this kind of thing: the renovator might consider what activities these people want to engage in separately and together? Let's all think about that including a wide range of activities. What we're finding are three business guys who can't get decent housing. These are not just simply co-habitating couples, these are groups of three or four people sharing a house for a number of reasons; can't afford a place on their own, want a much nicer place that has a deck and a view and a good location, etc., so there are a lot of motivations going into that kind of house sharing. You might look at a place that you're going to renovate, for example, and look at it terms of what activities would these people want to engage in separately and together. Preparing food at the same time comes to mind. Some of the new role definitions within the nuclear family suggest that these role domains break down you might have two people actually wanting to make dinner at the same time. One of these people might want to be pursuing hobbies in the same house at the same hour with some good space and sound separation and privacy considerations. I don't see any of this as something that a good architect or designer couldn't latch onto and it has been done.

I would suggest one dimension to pay attention to in dealing with the house sharing phenomenon which I'm looking on as the smallest scale kind of innovation that I was discussing, is this dimension that one calls privacy-communality which runs through all habitat considerations at every scale, the house, the cluster houses, the neighbourhood and indeed the city itself, balancing the need for privacy and the desire for communality.

In this question of seniors sharing homes I would think if there is any chance of this complimentary synergetic sort of planning going on for these people, then we might want to consider more units, not just those exemplary five or something that are created for wheelchairs, but a lot more basic planning for the elderly and for the handicapped at the home building and renovation level.

I'd like to move on to second level cooperative housing, which is, I understand, not in such good standing with private home developers, but which has increased quite a bit in Toronto over the past decade thanks to extremely generous government subsidy programs. It does appear to be emerging in this new framework that I've outlined as something that we really must begin to think about since the income level of people who are unable to buy any kind of a home is moving upward into the middle class creating some very interesting political problems. I would suggest that a second scale in which we might wish to consider ways of adapting our design for energy conservation to our habitat, is at this cooperative housing level. Many of the previous kind of house sharing and elderly undertakings are also being attempted on a cooperative level but not all cooperatives are sort of cute little, small scale, amateur effort. This may have been the case. It is rapidly becoming not the case. What I'd like to focus on then is the aspect of cooperative housing which is most directly linked to this need for synergetic activities. One obvious function of the 'co-op,' of course, is that they provide decent, affordable housing. In some cases, of which you have some good examples in Toronto in the St. Lawrence area, they also provide for some relatively well-off types at locations in the city centre which would otherwise be unavailable because the prices are such that only the wealthy can afford to rent or buy outright in the going market. What's synergetic about it? People are there, you know them, there's a closeness in cooperative housing which has been testified to and it's sought out by cooperatives, who educate and choose their members.

There are two aspects, however, of cooperative developments which I think merit special attention in terms of the trends that are developing in our society. One has to do with the potential both in new construction and in renovation to build in energy conservation and conserve society facilities. For instance, the basic necessities of caulking and weatherstripping and the like, which, as unglamorous as they are, actually do constitute far and away the most effective way of cutting space heating loss. In addition to this kind of basic work in renovating or building, your cooperative buyers are simply more ready to listen, because of the types of people they often are, to the idea of installing a solar green house, for example, for the production of food as well as supplementary heat.

Cooperatives attract the kind of people who would be interested in conserver society activities. They are the type of people who start food co-ops. Co-oping, in a very interesting sense, and in increasingly mature and effective sense, is a movement; it is a way of saving money. We're getting housing. We're getting things cheaper. The solar greenhouse which I must say has become a standard symbol of this kind of synergetic activity, because as you grow food, it produces heat, is good for old people and children who can work there. It can be parodied but I think it has the strength that makes it a good symbol.

The other aspect of cooperatives, and we're looking at intermediate scale kinds of things, that I think is worthwhile paying attention to, in terms of synergetic outcomes is what has been called 'self-direction'. If we looked at one dimension and called it privacy and communality, then I think another major dimension that we should be thinking about in designing homes, neighbourhooods, and indeed a number of things in this society, is an emerging desire to be self-directed rather than managed. Another way of putting it is to be doers rather than simply consumers. We've seen it all the way back to the guy who decided to build his own bookshelves. That again is nothing startingly new. It's just that it's pervading alomst all elements of the society. Citizen participation is one form of that. This feeling that we want to de-centralize both facilities and decision-making power. That's another way of getting the handle on this idea. I don't want to be managed. I want to have some control over all the aspects of my own life. You see self direction in health care, etc. This is one to be aware of. People are ambivalent, there's part of us that would love to be taken care of but I think that this is a strong and emerging trip.

The classic drawing shows cooperative housing units always very attractive, clustered around a central space. In the central space in varying forms are the ubitquitous solar green house, a recreation area, probably attached to the day care centre; some of the more ambitious versions of this have bicycle repair shops, recycling depots, compost facilities, etc. I think it's a terrific idea myself. One hears a lot about in-filling. I'd like to see some in-filling of that sort. I think that would be extremely exciting and I think the market, if you want to call it that, is big, both in cooperative housing and in private housing. It will probably take some selling but then in our society that certainly is nothing unusual.

A final level of scale which interests me very much is the neighbourhood level. In the U.S., particularly where slum areas are in such dire straits, people and governments have turned to neighbourhood development and re-development for job training and job creating. Job training and job creation have been linked to energy conservation initiatives of various sorts; the most obvious one is, of course, takes unemployed youth and teaches them how to do energy audits. Then you set up a company to go and caulk and weatherstrip houses. That's hardly "hi-tech". One just doesn't understand why more of it isn't done. The neighbourhood concept offers that possibility.

In the design area I will give a very quick example that I just came across last week. A U of T architect named Larry Richards, who's coming to the University of Waterloo as Head of our School of Architecture, developed a district in Halifax utilizing some open urban space that apparently nobody wanted. It's a really exciting concept at the neighbourhood level called a people's food place. It sounds a little cutesy, but actually it is very effective. It has spaces for food storage, food co-ops, class rooms for nutrition classes and connecting walkways and so forth. I would suggest that if you're looking for those kinds of synergetic uses of space, money and talent, this would be a good example of that.

Andy Brethour:
Vice President of PMA Realty Group Inc., he is a member of the HUDAC marketing committee.

Marketing is essentially communication. It's delivery of a message and certainly in my reaction to energy features in either renovated product or in new housing, it's really communicating two key factors towards buying decision by our prospective purchasers who are out there day to day. One is the communication of technology, listing the actual delivering of the techniques and the elements of energy conservation in housing and the other is the communication of cost and the benefits related to that cost.

I thought I would relate a story to you that happened to me recently in Montreal. I was there talking to a group. Well, the group I was talking to didn't know Toronto very well at all. They were about 250 people and they were moving here with a major corporation moving its heads office to Toronto. They were all looking for housing opportunities and I was attempting to try and explain to them what the Toronto housing market was all about. I was having a tough time. I had an overhead projector going and I had some slides going and I was trying to tell them, "Yonge Street is here, the 401 is over there," and someone said, 'well how far is the Go Train and how long does it take to get from Brampton to downtown?" I was having a tough time and I had some overheads dividing the city in half and I said, okay, flipping them back and forth, I am losing the audience completely. They are not paying attention. Suddenly I said, 'I've got it. I can figure it out now. I can communicate this very simply and understand Toronto.' I said, 'find Yonge Street. From the top of my head to the bottom of me, that's Yonge Street; it goes straight up and down, north and south and that's the 401. Just like that. About here is Oshawa and over there is Burlington and the top of my head is Newmarket. Right across the bottom is the Queen Elizabeth Highway. Some one in the back said, so where's the CN Tower?'

Energy conservation is simply another factor to merchandise. It's another feature in a home that we merchandise and we market like any other product or any other feature of that home. It is related to elements not unlike, say, a circular staircase of a greenhouse kitchen or synergistic environment but it is all of the things that you might take and merchandise in energy conservation. It's a feature with a benefit at a direct cost and that's what a purchaser or prospective purchaser is looking for today. On November 2, 1981 the buyer is not prepared to pay a high cost and I'm thinking of items that we are including in terms of upgraded insulation, heat pumps and from passive to very active solar components. He's been hit recently and certainly as you know, we've all been hit very recently with a double-barrelled gun between very dramatic price increases and very dramatic increases in interest rates. In fact in a nine month period, we've seen prices in the Toronto area jump by 37 and interest rates by 67 percent from eight months ago. Those are dramatic double-barrelled shots. On January 1, the first major price increases on energy costs hit us as Canadians and that will be barrel no.3.

Affordability of the total home far exceed the concern for any one part of the energy conservation. How do you overcome that particular public perception? In a U.S. study done in 1979, the U.S. public and consumer study done by the Sales and Marketing Council in the National Association of Home Builders energy features ranked No. 13 in terms of preference for motivating factor for purchasing a new home. By mid-1980 after the severe oil crunch of 1979 and into the 1980s, energy has surpassed every other item except location. It even surpassed price and comes in at No. 2 in terms of the U.S. consumers' attitude toward energy conservation. We are not seeing the same kind of phenomenon yet in Canada but we will.

I am going to leave energy to the energy experts and talk about the primary market opportunities in the '80s. As I look forward perhaps to the '90s and the year 2001, how will energy conservation affect our lifestyles and the consumers lifestyles in house purchasing, the house product and the types of units that I am involved in building and developing? We are essentially in a maturing market place and really that's what I would like to address myself to. One of the things that one will hear often from builders, developers in response to energy is comments not unlike this , "Quite possibly we've planted the seeds of our own destruction." You will see them often in meetings. I sit around the boardroom table early Monday mornings and ask why did we include that heat pump at an additional $3,000 a unit into the price of that home? The attitude in the building development industry has been negative — they've been afraid because we live and breathe on the consumer, the purchaser of our product. The typical reaction — a builder is called before the new home warranty disciplinary committee when his heat pump didn't work and his reaction was, why can't they just understand this is the best they can get at this price. Well the reaction of the building community has been one that is perhaps different — it is learning the private entrepreneur must respond to the buyer and purchaser and it is. I know that all our problems are relative. On a recent trip, I went to Dallas. I was sitting talking with a builder from Dallas and I got talking to him about his particular scene. So what's happening within your market? What are your problems? He said to me, "well Son, I'm telling you, "he said," the only problem we've got is selling those small lot singles". I said, "we've got the same problem. People are funny; it's really hard to adjust to 30 foot singles and 20 foot singles, in fact, we are renovating product in downtown Toronto right now with 12 and 13 foot frontage lots." He looks at me and says "the problem we are having, though boy, is our small singles are 100 footers, 100 and 150 frontage." I said "you kidding." "He said," no, that's what really we are having problems with". "I said", by golly, can you imagine?" "He said", I'd never even put my dog on one of your 20 foot lots".

Our problems are all relative. They are all different. They are perspective pronounced in different areas of the world as is brought home clearly by Neal in some of the European examples and by Bob in some of the futuristic examples. In the more immediate sense, in looking at a Canadian market. On the market that I'm most familar with within the Toronto scene and dealing with the maturing market place, one of the most significant changes over the past four or five years has been the aging of the baby boom, the main driving force behind the consumer market which accounts for about 30 percent of all dollars spent. As the cliche goes, 'Time waits for no man,' or as Winston Churchill might have said, to those of us caught with the baby boom like me, 'It is not the beginning of the end but is really the end of the beginning'. Time magazine zeroed in on it in the spring of 1980 with the following:

"The early baby boomers are now closer to death than they are to birth". Very interesting and how does that affect you and I as individuals? I am not going to lecture you on your own mortality. But rather, I would like you to come to terms with some of the changes in our marketplace and the profound implications they hold for my business in the new home merchandising field.

Obviously, we are not the only industry that is being challenged by an aging marketplace. Robert Brown, who is a professor at the University of Waterloo pointed out that, with every passing year, North Americans creep ever closer to collective old age and, as a consequence, their marketers will encounter challenges of sufficient magnitude to turn their own hair grey. Also there will be substantial rewards for those who remain mentally spry in adapting to the winds of change.

To fully appreciate the magnitude of these changes, it is necessary to go back in time to the post-war baby boom. Between1946 and 1961, Canada recorded its highest birth rates of the century. The fertility rate soared to 3.8 from a depression low of 2.6 and those similar booms took place in the U.S., western Europe, Australia, New Zealand — Canada's baby boom was the biggest anywhere and was virtually a tidal wave. Maternity wards bulged, school enrollment leaped, teaching became a boom profession.

In private industry there were successive booms in everything from Dr. Spock's Baby Care manuals, diaper services, the millions selling pop records and blue jeans, and as the boomees moved from infancy to teenage years, by 1961 in Canada, a whopping 42 percent of the population was under 20 and they were all riding motorcycles. But the bottom was falling out of the market.

Beginning in the 1960s fertility rates began to plunge and slip downward as a result of better birth control methods and an increasing female participation in the work force. Canada moved, in just two decades, from its highest birth rate for the century to its lowest. The fertility rate now stands at 1.8 — almost half the post-war high, below even what demographers call the replacement level. With the fertility rate remaining at it's current level or even slipping further, according to some experts and with fewer infants marching toward adulthood to replace the post-war generation, the cohorts of the aging boomees will overwhelmingly remain at the forefront of demographic forces. The baby bust as it's now called, besides causing an eventual slowdown in the growth of the labour force and in all probability, the economy, will force the private sector to adapt new realities or go to the wall.

Andrew Weiner writing on the baby boom market in the Financial Post noted several examples of the private sector altering their market strategy in reponse to the threat of product obsolescence. For example, would you like to be the marketing manager for 'No More Tears' baby shampoo if there were fewer and fewer babies. Try to maintain sales for Johnson and Johnson baby powder when the baby bottoms are fewer and far between. No we've got to sell 'No More Tears' and Johnson and Johnsons to her. Well they did it and they've been able to snatch victory from the jaws of disaster by addressing their product lines to the adult market. Beginning as early as 1965 and consequently now, 80 percent of Johnson's baby powder and No More Tears shampoo is being used by adults with the whole marketing strategy based on what is good and sensitive enough for baby must be good enough for the adult he, she or it.

What about blue jeans? It has been suggested by some that the bottom of blue jeans has been expanded to accomodate the more mature physics of the aging boomers. In 1976, the world' most famous jean maker, Levy Strauss and Company launched Levi's for men with a little more room in the seat and thigh to cater to the over-25's unwilling to hang up their blue jeans for good. More recently, the same firm has added a full line of bend over pants with heavy elastic waistbands and stretch banding for female consumers whose centre of gravity has slipped slightly.

Similarly, Canada's Thrifty chain, noting the switch in buying patterns, from the 24 to the 29 inch waist to now 32 to the 36 inch waist has introduced a new men's jean called "Cinema" which is broader in the hips and aimed at the over-25s. Their new marketing campaign will be called 'the wide screen look'.

It can be a very active lifestyle that's filled with freedom. You've seen lots of these kinds of ads and lots of this kind of merchandising. It's very reflective of a whole shift in product emphasis to the boomee. One that has changed tremendously and which you will recognize is breakfast cereal. Again, the marketing strategists for Kellogg's have altered their pitch from, as you remember, 'sugar snacks' aimed at the under 13 year olds complete with cartoon characters and box top give-aways, to more adult brands, high in fibre and low in calories such as Kellogg's Quaker Oats and Corn Bran which have their pitches based almost exclusively on nutrition. Again this strategy has worked extremely well and, for the first time in years, such old favourites as Quaker Oatmeal have begun whole new leases on life.

Obviously we in the new home industry must look at the targetting of our product within the context of a market that is shifting into old age. I believe in the future, there will be three primary target markets that we are going to aim at. The first one is the first time buyer, the young single. The second is the boomee. That great devotee of stretch blue jeans and the empty nest or retirement market.

Let me address for just a moment the first timer. It's a major market opportunity which we tend to ignore or look at from a perspective in the new housing field as one we can't reach in the current economic conditions. Obviously, we are talking towards 2001. By then we all will be earning probably over a quarter of a milllion dolllars a year and paying 57 percent on our mortgages. One of the major market opportunities is the young, single the young couple and young children. We've got it in our system that we must have a single family home. It's going to take a long time to change, if it ever will but affordability is the problem right at the moment. This particular individual, this young family, is having a very difficult time and will continue to have a very difficult time to reach for that first home ownership opportunity.

Up until two years ago in the Toronto market, that young family could reach and own a single family ownership within a reasonable travel distance of downtown. Today they can't. Expectations are going to have to be somewhat lower and he's going to have to look at different housing forms. He is going to have to look principally at product which will be of much higher density. What I am talking about is a move to much higher forms of density and much higher forms of multiple development in and around major metropolitan areas; trying to adjust to the fact that single family housing will no longer be available or at least it won't be in my first purchase, not even my second; it might be my third or fourth. It will still be there, by the way, in the next 20 year horizon. Doing 30 percent of our activity in the Toronto resale market, used housing is condominium product priced under $65,000. It does cater directly to the first time buyer.

The suburban or even the downtown renovation now within the downtown Toronto market area is out of reach of the first time buyer. One of the key elements of a home the Toronto home builder is involved in is called the maximizer. "Maximizer II" as a matter of fact and it is a product that is designed not only for energy conservation with major conserving features within it, but it is a shared accommodation unit. It is able to be built on a 30 foot lot. It is built as what we describe as a life cycle home. A first time purchaser can possibly buy it. These high rates would make it difficult but it has a rental component as part of it and that rental component becomes the shared accomodation to help alleviate some of the affordability problems. It is convertable in that as that young family begins to expand in size and grow and goes to 1.8 or a little higher in household size, the renters can, in fact, be displaced and the house converted into what starts out as a three bedroom component and a two bedroom component to now, possibly, four or five bedrooms or maintaining three and creating a new familyroom and other features within it. As that family grows older and the need for income supplement becomes greater again as they reach older age, that individual then can, by removing only two partition walls, the size of doorways, reconstitute the rental unit and the lifecycle is complete. They have reached maturity — their family is gone — they don't need all the space. They remain within the neighbourhood. It can be built on a single family lot of 30' or less. It has been a very difficult model to get municipalities to zone for but one that Scarborough has and hopefully you will see some of them being built.

There is also a tremendous opportunity in the shared accomodation side of the world. The he, she or it fit any of the above markets; that's the two young guys, the two young girls or whatever there might be. We are building product with two master bedrooms and one really elaborate master bath in Washington at the moment and it is a real winner even in this very depressed market. Two single people are coming in, buying a townhouse product designed like that to their lifestyle, something where they can get into the ownership and get on the equity gravy train. Did you know that in downtown Hamilton, that you can actually purchase one of these homes like that for $12,500.

There is tremendous affordability within some of the communities outside of the heavy pressure areas like Toronto or some of your other major cities. The same thing is happening with Calgary, with Edmonton, within Washington and some of the markets that we are involved in in the States. Some of the fringe communities, the smaller communities, are realizing some tremendous renovation markets as well as what I would predict is return to the rebirth of the small communities around this to single family housing. One will have to travel farther if you want that single family housing 'dream'.

That raises the issue of energy conservation and the issue of commuting. It's very interesting to note that even with the doubling of gas prices in the next four years, the commuting costs will not change for an individual since as gas per gallon is going up double, so is the mileage per unit. We will see, by 1985, automobiles getting 100 miles to the gallon. Mass transit will have to have a much heavier emphasis.

Let me move on quickly then to the next guy, the one I talked about the most which is the boomy. This is what the new home market in the future in the next ten years, and probably the next 20, will depend on. This market will still demand most of the profitable consumer products. He is going to be looking at single family, albeit on smaller lots with a smaller product. In terms of energy conservation, he's the real guy that we have to hit at. He's the one that will buy it too and it has to become fashionable and it will be. It will be fashionable to be 40 years old in another five years, isn't that fantastic? And it also will be fashionable to conserve energy.

Let me touch on the third market and that's what I call the 'retread market,' with all due respect. This is the move down, the real mover and shakers. 45 to 65 years of age. He's a move down and cash out and what he is doing is moving down from his larger single, that big expensive energy heating monster in suburbia and moving into high rise and townhouse products. He wants security. He wants no maintenance. He wants luxury features and amenities. He wants investment security and he wants a super location and, more importantly, they are really ready, willing and able to pay for it. It's a luxury condo market and mid-luxury condo market in a move down sense. It's a very big one through the '80s and early '90s. It's really what I call for the geritol generation in designer jeans.

Watch for multiple units, watch for multiple developments. We are going to do one in Grimsby, outside of Hamilton. It will be the first major retirement market to hit southern Ontario ever. There's one happening in Richmond Hill as well. These will be low rise, multiple units. The multiple unit concept in clusters of four to six developments will all be bungalows within 50 to 60 miles of a major metropolitan area, all aimed at a retirement move-down market with extremely affordable product because of the land cost in suburban areas. There will be tremendous emphasis on co-operative ventures perhaps product that will all be condo. There will be no single family ownership and it will have every feature and element that you could think of.

Those are the three major markets. I leave you with the thought, from an energy conserving point of view, for the first time buyer or the he, she, it and single and the young professional to the boomy and to the empty nester, move down and cash out, that all of our products have to be designed with flare, have to be designed with tremendous emphasis on features, tremendous emphasis on cost and reducing costs and reducing energy conservation cost. It can be done, it's effective.

QUESTIONS & ANSWERS

QUESTION: Will there be a reasonable market for an 1800 to 2000 square foot house ten to fifteen years from now?

MR. BRETHOUR: Yes, there will be. It will be extremely expensive. It will be catering to a very small market segment and we are seeing that now. Our current market to look to move up buyers is of smaller straight relationship to affordability. Of course the market will be a lot smaller than it is right at the moment and more of our housing will be into multiple and higher density product fifteen years from now.

QUESTION: Other than Scarborough is any municipality adopting unique by-laws tailored for the maximizer?

ANDY: No, not as far as I am aware although we've had enquiries from right across the country and the States for the plans and the look of the product. Scarborough has approved it and we will be building in Scarborough. It's being lotteried right now with the proceeds to the Canadian National Institute for the Blind. you can buy a ticket at the CNE. You will see more of this product if we can get municipilities to go for it. One of the problems has been typically the concern that in a residential neighbourhood or typically residential neighbourhood, you are mixing a rental component with an ownership component, parking, too many cars, all the municipal concerns that are normally there. But Scarborough has gone along with it.

Section C

HOUSING AND ENERGY

8 Integrating Housing And Energy Conservation

Dennis Rogoza:
Director of Marketing and Sales, Enercon Sales Ltd. of Regina, Saskatchewan. He is a former energy expert with the Saskatchewan government.

Climatic responses are probably key reasons why Saskatchewan has demonstrated its innovative nature over the years. Given the number of speakers at this conference from my province, it's evident that we are again doing something right. This time, it's energy efficiency in housing. About ten weeks ago, I was in rural Holland at a friend's place churning cheese when I got a call inviting me to participate in this conference. After a lengthy discussion, I agreed the so-called "Saskatchewan story" was a good one to tell. I am going to try to give you a short, short version of that history because I am sure some time in the future a book may be written.

I feel this story should not be told out of the context of what I personally consider the most critical question: that is, how do we make the quick transition to an energy efficient economy of which energy efficient housing is only one component? I believe that the critical and central question facing us as a society.

The Saskatchewan Conservation House Program and its follow-up program were just the first steps in this transition process. They were important and have shown the way, but the challenge facing us now is what this conference is about. What do we have to do tomorrow to overcome the obstacles towards building toward 2001? For the past decade, the world has been embroiled in a long overdue re-evaluation of the role energy plays in our economy and society.

If we have listened carefully to this debate, it is obvious that the social focus has been one-sided, concerned primarily with the re-evaluation energy supply. As this debate has continued, it has become apparent that the other side of the issue, that is, energy demand, needed to be addressed. This preoccupation with energy supply was possible when we were confident of unlimited energy resources. Now, as the real price of energy increases and the costs of new, conventional, and indeed, alternative renewable supplies increase, there is a critical need to look at the energy demand side of the equation.

Energy is a commodity which provides us with a range of services such as heating, manufacturing or transportation. Presumable, it is these services which are required and not the energy itself. To provide these services with less energy consumed, that is, reduced energy demand, is a major challenge and, indeed, presents us with major opportunities. This concept of reducing demand through efficiency has been called energy conservations, generally speaking, and many people call it energy management. I believe it is a very misunderstood subject, and I would hope that maybe George Gough could provide some clarification on what the consumers think out there.

My impression is, after talking to thousands of people, energy is misunderstood, and there are those people — and I think almost the majority — who believe that energy conservation implies being cold in winter, warm in summer, and waiting in gas lines. In fact, these activities would more rather define energy rationing and would be the result of actual or anticipated energy supply shortages. In my view, energy conservation should be defined as the reduction of energy demand for a particular activity based on socially acceptable technical, economic and other criteria.

Reducing the energy demand for a particular activity need not lead to austerity, but can, in fact, maintain or improve the quality of our lives. We can do more with less and indeed, the world is going to belong to the efficient and it is self-evident what the lessons are from Japan Incorporated.

The roots of the Saskatchewan Conservation House go back into the history of the province and its people's response to climate, economices and politics.

A first exposure to -40 temperatures produced a real fast response from my grandfather when he built his homestead out of the bush. A log and mud hut. The R factors in the walls was about 4, the basement was essentially kept warm by the mice, and the attic insulation consisted of the nine children who slept there. The mud and timber were free, but discomfort was very high. It was an experience which my father still talks about and indeed, my aunts and uncles. Seventy years later, they all live in modern houses, each with at least three times as much space as the old homestead.

Definite progress occured in housing during these seventy years, but a new factor emerged in October 1973. Essentially that was the Yom Kippur war and the subsequent rise in oil prices. Now I think it was evident to everyone that when you throw high heating costs at the so-called "modern" home, that these homes are simply inadequate to cope with these costs. Two conclusions have been drawn from this over the years. One, was that we had to find a cheaper fuel — a supply strategy — and two, that we had to waste less — a demand reduction strategy — and it seems to me that, by 1974, the United States had clearly chosen the new supply strategy, primarily active solar space heating. A good example of this was the many hundreds of firms which were being born almost every day during the mid-70's and into the late 70's. Perhaps the Canadian choice was to think about it first and follow the American choice, but more slowly. After all, active solar is, as 'high tech', glamorous, very visible and, indeed, it is very politically visible. Because no institution had any capacity to think about either choice, governments decided the first response of any magnitude would be to put into place resources, primarily people, who could try to understand what was happening and provide some guidance to the process.

In Saskatchewan, this process began in 1974 when I guess I was hired as the first token. Back then, the energy crisis was simply viewed as a price crisis with no clear perception that demand management was of any significance. To a large degree, I believe this view still prevails in the corridors of power. Indeed, the blank cheque being written by the federal government's off-oil program to have consumers change from wasting oil to wasting gas is evidence of this. But in Saskatchewan in 1974-75, there was a "something must be done" feeling in those corridors and, in retrospect, I think it was more than tokenism. There was more of a let's identify with the problem and let's get on with the job, we've got to start somewhere, let's do it right.

In my view, there was some special reasons why the

Conservation House program happened in Saskatchewan. The first is that housing affects everyone and therefore, is very political. It's a priority for government. The second is the history of innovations in the province and, indeed, almost a leading edge role that the government has played in it. The third is that we've had a history of research in housing and an example of this is the division of Building Research of National Research Council of Saskatoon where Harold works. And the fourth, which is perhaps one of the most important, is the strong interlinks which exist between government agencies, research institutions, universities, and the private sector. These interlinks permit a very strong cooperative approach to problem solving and I think it is a combination of the first three factors plus the small size which permits these very strong interlinks and close When all these factors were stirred around the old cauldron, out popped a solution to the mandate of "get on with the job", and that essentially was a low-cost, high profile, energy conserving home. The Conservation House took, as one of its reference points the contorted experiments which had been occuring with active solar systems and their attempt to substitute as oil frunaces. Since it was self-evident that such systems were economically mis-matched to the large energy demands of a conventional home, the Conservation House simply started from a different premise, that is, it was better to conserve energy than to look for new kinds to waste. This promise provided the central guideline to the design team from 1976 through when the project opened on a very bright, very sunny, and very cold January 12th, 1978. And on that day I think a major new reference point for housing was established. The reason is quite simple. The Conservation House clearly demonstrated that energy demand reduction was easy, was cost-effective, and essentially was the winning substitution for the price of conventional energy sources.

Well, what successes did the project achieve? I'll just mention a few. One was public awareness. From when the project opened to when it closed, almost 40,000 people toured through the house, and I think the importance of this is demonstrated not just in the numbers but, more importantly, that many of these people became convinced of the technical features of the home and indeed have built their own homes with many of these features. An example of what is happening in the Saskatchewan market place is, from personal experience, my company alone has designed and/or built over as 100 select houses for clients in the space of the last two years. I think the second success was that the project led to the coalescing of a group of organizations in Saskatoon which essentially ended up with the development of a centre of building expertise. There is now an internationally recognized group in Saskatoon from the National Research Council, the Saskatchewan Research Council, and the University of Saskatchewan. I think the third success was the establishment of new industry. It was always obvious that airtight super-insulated houses needed new products such as heat exchangers and in Saskatchewan alone there are now three manufacturers of this product, two in Saskatoon, and my company in Regina. I should say all three companies are very aggressive with national marketing programs and our company, for example, is very active in the United States as well. The fourth success is probably in the area of new demonstration projects because while it was clear that the Conservation House was a technical winner, it was also clear that the housing industry would need to be convinced and learn how to adapt these ideas to their own designs.

A bridge was necessary between the mass market and one technical project, and I believe the Saskatchewan government recognized that theoretical arguments and arguments coming out of the Conservation House essentially were not enough to take us to the next step. The result of a lot of thought and many hundreds of hours of discussion was the support for a large scale project in Saskatoon which actively involved thirteen builders with the centre of expertise I mentioned earlier. The value of learning by doing is universally recognized and was universally recognized. If the mass house ministry is going to build such houses then they must learn how to do it.

The Saskatoon project which opened to the public in October, 1980 was a very large success. Saskatoon is probably now the leading area in Canada for the construction of conservation-type houses. The final component in the government's efforts to affect the new housing market was the home energy loan program introduced this summer. This program offers a $3,000 interest-free loan for a ten year repayment period through the Saskatchewan Power Corporation power bills and offers this program to anyone who buys a new house which meets certain prescriptive energy standards. These prescriptive standards have their roots in the Saskatchewan Conservation House and, to date, I believe there's something in the order of 250 applications before the Office of Energy Conservation. So, I guess, in retrospect, it's very easy to see the government's strategy: establish a reference point; involve the industry in learning how to do it; then offer the consumers some cash incentive to buy such homes.

While these three projects had a significant impact on the new housing market, the question rose of what to do with the thousands of thermal slums still out there. Again, the government choice was to try and establish some reference points. A project was completed this year in which several homes of various vintage were retrofitted. There were many lessons learned, and I think probably the key lesson was that, since each house is different, each requires a different solution, most of which are costly, and of which the energy economics only make sense if one is renovating anyway. This is the reason why it makes so much more economic sense to do it right in the first place.

I'd like to turn my comments now to the future, related to the transition. The concept of energy conservation applied to the housing industry is still at an early stage of development. It is past the point of research, development, and demonstration, and is now beginning to move into the first stages of commercialization. Enough exploration has been accomplished to know that this concept answers the major energy related issues of the residential sector and does so without major disruptions to any facet of this complex industry.

The obstacles to implementation of energy conservation at this point are not so much technical or economic as they are institutional. In the residential sector, the main obstacle is the inertia of the industry which won't change until it has to. With time, awareness and increased energy prices, the consumer will provide the force necessary to change this industry, as he and she have done with respect to the auto industry.

The affect of this consumer pull is already evident as builders move to greater levels of insulation and installation of thermostats and efficient furnaces, and so on. The unfortunate aspect of this process is that while we are waiting for consumers' demands and builders' awareness to change, we continued to build hundreds of these so-called "thermal slums" every day in Canada — hundreds. Now if it's desirable to reverse this trend more quickly, it's going to take effort, and basically it'll require political will at every level of government so that policies can be implemented which will create the environment for energy conservation opportunities to be realized: a key role of government. By effort, we'll be securing jobs, creating new technologies for domestic and export markets, and, indeed, moving toward the goal of energy self-sufficiency.

Now that I'm back in the private sector after having worked for the government for awhile I'd like to make a couple of comments on the ironical relationship between the innovator-entrepreneur and the success of the transition process I mentioned earlier, especially as it relates to housing. On one hand I can see companies like mine are extremely important in proving the market validity of the concept of the super-insulated house and I think that there are a number of companies in Saskatchewan and elsewhere in Canada who have done this, but once we and indeed friends in the audience from other pioneering companies have proven up the market, the conventional industry will move in fast. This is already happening in Saskatchewan with the full support of the government.

History has always been rough on pioneers, the only ones who have really survived the move of an idea from research to mass market have been those who have found a special niche in the market. The entrepreneur is needed at a critical stage to provide that bridge to bring the idea of product into the market so that it can be accepted by market. Unfortunately, once you are there, you'd better have the financial staying power to compete with all the conventional established companies.

I guess what I'm saying is that the role of the housing innovator based on our experience is a very time-limited one. Soon everybody will be building this super-insulated home as their standard home: the market will demand it and, indeed, governments will require it.

Where do the opportunities lie in the transition to mass scale energy efficient housing? In three areas, I believe. The first is new products. There's no doubt that a limited range of new products is required for energy efficient houses. These range from heat exchangers to temperature control devices and I'm sure you can go down the line if you wish. These market are beginning to grow fast, I can tell you from personal experience. The quality of products on the market is also improving rapidly which is also part of the transition process of the growth process.

I think it should be pointed out that the two leading firms in Saskatchewan who pioneered the super-insulated housing markets are now very active in the area of new products, development and marketing. In my company's case, except on a custom order basis, the super-insulated housing business is essentially being left to the biggies of the industry, and it's our view that our future as a company really lies in the sale of products to this mass market of super-insulated houses which will be growing quickly and, I should say, south of the border as well.

As an anecdote, I could say that I was at a very large energy expo in Minneapolis about two weeks ago, and I was absolutely stunned with the number of people who approached us in our booth who indicated an interest in building the super-insulated house. It was the best response we've ever had, including any in Canada.

I think I would be remiss if I didn't offer a comment about the role of financial institutions in this transition. Based on my company's experiences, it seems to me that the Canadian banking system has not been an especially positive factor. Indeed, it's probably done a good deal of harm to the transition timetable by not recognizing the importance of energy costs when determining a consumer's ability to repay a mortgage. The P.I.T. and E. formula (the Principal, Interest, Taxes and Energy formula) I believe will have to be used if super-insulated houses are ever to see the mass market. Indeed, on the business front, in terms of the Canadian banking system, I'm afraid we've found the system to be very expert at refrigerator loans but not that good when it comes to supporting an entrepreneurial organization. Our experience again has been, because of our U.S. operations, that we have had a great deal more support there than we have in Canada. It's unfortunate.

This second area of new business opportunities lies with what I would call special services. By this I mean that the super-insulated house, either individually or in a suburb, has a new set of requirements, such as the training of trades, custom designing, testing for airtightness, urban design, and so on. I think new industries will be created, or old ones adjusted, to respond to these changes. An example of this is the dozens of solar and conservation consulting firms which have been established in the last three years, essentially, to respond to this special services market. Of course, another always reliable test is the number of conferences like this one being held per month, and indeed the nature of the speakers and the attendees. I can recall that in pre-Yom Kippur days, only the zealots and the converteds seemed to attend — it's a much changed audience today.

The third area of business opportunity is in retro-fit. It's apparent, as energy costs climb, even with cheaper domestic fuel substitution programs, homeowners' costs will still be very high. Of the ten million homes in Canada, or so, I'd be willing to predict that probably maybe 10 percent will be declared as unfit from the energy perspective and perhaps torn down long before their useful life is over. The balance will have to be energy upgraded, no question. The economics of retrofit, unfortunately, tend to follow the law of diminishing returns. This makes it especially difficult. The first thousand dollars invested will perhaps solve 40 percent of the problem, the next thousand, perhaps 5 percent, it varies by house, but you diminish quickly on your return on a retro-fit market. To date, the retro-fit business is in a fledgling state — it is primarily a cottage industry focusing on re-insulating attics and installing weatherstripping. As fuel prices make the economics of retro-fit more realistic, a whole new industry will emerge and I think I can readily visualize the McDonald's approach, franchising, which links capital, new technologies, new products and indeed, organization of local labour as a huge business opportunity.

Well, where are we now in this transition process to an energy efficient housing stock? Not that far. We've taken some very important first steps such as the Conservation House and the subsequent programs in Saskatchewan and, indeed, many of the other programs which are now happening elsewhere in Canada, both nationally and on the provincial scene. We need to absorb the lessons learned and get moving to ensure that all new housing is built to super-energy efficient standards and that existing housing is energy upgraded. If this isn't done, then I have to ask who, just who, is going to pay the price? Unfortunately, I think it's going to be you and I.

Harold Orr:
A researcher with the Division of Building Research at the Prairie Regional Laboratory of the National Research Council in Saskatoon, Saskatchewan.

This isn't the first energy crisis the world has known. There are a number of other ones, and I would like to bring a couple of these to your attention. Back in 200 or 300 B.C., or maybe even longer than that, there was an energy crisis in the centre of the world population at that time in North Africa. North Africa, if you will recall from history, was covered heavily with extensive forests. The people used the forest to make charcoal, particularly to cook with. They didn't need it for heating particularly, they literally destroyed the total area, the forests of the total area of North Africa. They did not solve their energy problems, and we now have the legacy of the Sahara Desert. Back in the 1300, 1400, and 1500's, they had an energy crisis in England to a very major extent and the fact is it became the law of the land that you shall not use wood to burn because of the serious energy crisis. They solved their problem by looking for and finding an alternative energy source — coal, and they went underground, started mining coal. Another problem was solved and you know Watt developed the steam engine, and Stevenson put it on wheels and made it into locomotive. From that were the roots of the industrial revolution. They solved their energy crisis by going to a different fuel.

We have a slightly different picture right now. We have another energy crisis and we don't really have the other fuels to go to. We are at the stage where a lot of the fuels we currently use are in short supply and the result is that we are going to have to look at what we should have had in the first place, at conservation techniques.

Conservation — I think that's a better ethic than trying to change over our system — to try and capture cheap or diffuse energies from solar and wind, and that sort of thing.

Let's consider the Saskatchewan Conservation House. I'm sure that many of you have seen pictures of it and read and heard about it a little bit. When we were designing another house, there were houses in Saskatchewan that were using R20 on the walls and R40 on the ceiling, and I said if we wanted to build a house that went well beyond the Saskatchewan Conservation House, we had to use a lot of insulation. Our model has 12" walls, it has R44 in the walls, it has R60 in the ceiling, it has about R35 in the floor. It has no basement, because a basement is still one of the problem areas we don't know how to solve properly. We were criticized because of this house because of the large amounts of insulation in it but we were asked to heat the house with solar energy, and you have a solar collector up there, that the hardware cost that I believe was in the order of $30,000. If, going back and doing our calculations again, I would suggest we could achieve the same thing as a solar collector is doing as far as heating the house is concerned by adding about 6" more insulation to the walls at a cost of under $2,000. Now, any time I can invest $2,000 and get a $30,000 return on it, lead me to it, I'm all for it. I think most of your financial people will be there for it too. This solar collector, however, you must realize, requires maintenance. The first year alone I believe the maintenance alone was $8,000 on it. Anybody got an $8,000 fuel bill?

Well, we went from the Saskatchewan Conservation House to a number of other houses built around Saskatoon. There were a number of houses constructed around Saskatoon, some of them with some very, very nice features and some of them having some problems. Then we have the Energy Showcase Project that was opened on October 1st last year and was opened until Christmas. They had something like 60,000 or 70,000 people go through these houses to examine what to do to save energy.

As a result of this, today in Saskatoon there are about 250 low energy houses currently in the city, and more going up every day. We are trying to keep track of it, and we're finding it difficult or impossible to keep track of all the low energy houses being built.

One particular one was, at that time, the tightest house perhaps in Canada perhaps the tightest house in the world. It has 18" thick walls with R60 in the walls and R60 in the ceiling and R28 in the basement and so on. Another model house with R60 walls, R60 ceiling — there are now six of these in Saskatoon — and these houses are essentially zero energy houses. I don't know what you define really as zero energy for heating, but they come just as close to it as you can possibly get. This house really needs one Kilowatt on the main floor level to keep the house warm in the very coldest climate that we have. We're using this house as a test bed and we heated it last winter. It has a natural gas furnace in it but we heated it last winter for four days with the gas furnace and then we plugged the chimney, turned the furnace off, and heated it for 4 days with an electric space heater. The heater that we have for this is just two of those little radium things that you plug into an outlet — 1,500 Watts each. We have 3 Kilowatts of heat upstairs in the house which we put in the corner of the dining room and we are monitoring the temperatures in the bedroom to see what happens in the bedroom. When you have heat only in one room of the house, you find that the house temperatures of the other rooms are a little cooler. In fact, in the very, very cold weather, the temperature in the bedrooms is about 18. That's normally what I would set my thermostat back to at nights anyway. And in the daytime, because the sun is shining in the windows and so on, they come up to more normal temperatures. When you do this, when you build houses of this sort of calibre, we need to start looking at total new systems for the house because we are looking at a whole new ballgame.

We don't need a 100,000 BTU furnace, we don't need a 40,000 BTU furnace, we don't need a 20,000 BTU furnace, we need a 15,000 BTU heater in this house, and when you get down to this sort of level, nobody makes them, and if they do make them for tent trailers and so on, they are beastly inefficient, and there's where we need some development and work. What we have is a heating system that can be installed in a house for $200, and I can replace the $1,200 furnace system. And when I can do that, this means I've got $1,000 additional that I can put into something else. The fact is, this house doesn't have

$1,000 worth of insulation in it.

Another example of low energy use is in a by Concept Construction. It has a greenhouse, and in the greenhouse, it has a Tremblay wall, and it has a roll up and down shutter which you can see there in the window. Another house is a double wall house. Another is built using a wall truss, a 12" thick wall truss, a scissors roof truss, and a floor truss and this made a giant A, if you like, or D on its side. They used a crane to lift these trusses into place, and they built the house in 4 hours. The builders in these cases particularly were trying to achieve a house that would look no way different from their existing houses. But these are Energy Showcase houses and just a few of the low energy houses being constructed around Saskatoon.

Another very excellent one is out in the country. The whole thing is totally electric and the owner hasn't exceeded his minimum monthly bill yet. Some houses are a little odd-shaped and one is a rather different one, a stackwall house. Now, I don't recommend stackwall houses and I don't think the fellow who built it does either, but he was going to try this, and he built a stackwall house and couldn't live in it, so he built one which is a double stackwall. It's 8" stackwall outside, and then a 10" space full of insulation and then a 6" stackwall on the inside.

These are just a few of the low energy houses that there are being constructed today around Saskatoon. One of the principles of energy conservation is "get it together", two can live warmer than one, move in with your friend, shower with a friend and that sort of thing. That makes a lot of sense. I was in Europe and I was very, very surprised. I was talking to some chaps in England who are planning on coming to Canada, and work with this and I was showing them pictures of these houses. He was saying "what on earth do you do with all that space, how do you get furniture to put in all that space?", because his house, he says is about 850 square feet, and his friend's was 725 square feet without a basement. "What do you do with all that space, how do you deal with the furniture?", and I think that's one way we have to consider.

When we were starting work on the Saskatchewan Conservation House, and I think I would emphasize this as most important, we had to look at a total integrated approach. If you take the houses which were built in 1975, you can find that about one-third of the heat loss in the house is air leakage, one-third is through the windows, the walls and the ceiling, and one-third is through the basement. If you want to make major reductions in your heating bill, you don't put four feet of insulation on your door, even putting four feet of insulation in your attic is not going to make major changes. This is where I have to differ with some of the advertisers around who suggest, by insulating your attic, you're going to save 24 percent on your fuel bill. Well, I'm not losing that presently so how am I going to save 24 percent on my fuel bill? Is putting another sheet of glass on my windows going to save me 32?I don't see how I'm going to do that when I'm only losing 9 there presently. So, you have to look at a total integrated approach.

If we go to the super-insulated house, in which we go from an R12 to an R40 in the wall, and an R36 to an R60 in the ceiling, and go to triple-glazed windows, and even insulate the basement to the same calibre, even where we cut the air leakage in half, it's about 55 percent of the total heat loss, and we are making a major change there. What we tried to do on the Saskatchewan Conservation House was to reduce the air leakage to 10 percent of what it was normally. We came very close to doing that, and our techniques now are showing that we're able to do much better than that. We've got the heat loss down to a low level so that the gains from solar and from people living in the house are sufficient to provide about 75 percent of the heating for that house. We can achieve a 100 zero energy house by going a little further than we are presently going for example by making the house tighter!

Here is an example of a typical 'air leakage' through the ceilings and attic of an apartment house. The air has been leaking through the ceiling and comes up into the attic space and leaks out through the ventilators at the gable ends and out through the ventilators on the eaves, and so on. Part of the moisture in that air is condensed in the attic space here. We found that moisture became frost; we had about 500 gallons of frost for each apartment. Now, 500 gallons weighs 5,000 pounds — and there's a 200 to 1 ration in terms of the amount of moisture in the air to the weight of air that there is there, and so, 5,000 times 200. What this frost represents is a million pounds of air that has been heated up to room temperature, been humidified, cleaned, and all the things we do with it, and then it's been lost out through the attic. That's the problem, and I don't care if its boiling a cup of water for tea, or heating air, or whatever, it takes energy to heat it, and that represents an awful lot of energy. In other research we find frost around the attic hatch. Now think about it, your attic hatch is a doorway from inside the house to the outside. We've got people selling weatherstripping, showing how to put weatherstripping on but do you have your attic hatch weatherstripped? It's a doorway from the inside to the outside.

Here's another example, around the bathroom exhaust fan. Then we have ye olde electrical box. That's a problem, and when you start looking at the amount of air that can go through something like that, you can total a ton of air that's gone through a hole that's around the lighting fixture.

It's these holes in the house that constitute the major problem in terms of air leakage. They are like the round peg in the square hole. What is normally done is to take some fibreglass and stuff it around, and that's supposed to stop the air. Think about it, the same people that make this pink insulation make a green one for your furnace and you put it in and you expect it to filter the dust out of the air. Now, it's made out of the same materials — it's made by the same process and you put it into the furnace and expect it to filter the dust out of the air, but when you stick it up in the attic, you expect it to be air tight. I don't really know why a person would want clean air in the attic, but you know that's all we're getting.

I was driving down the highway one day in northern Saskatchewan and I saw this, and I just about drove into the ditch, and so I stopped and backed up, and I went in and knocked on the door, and I said, "Sir, I'm from the National Research Council and I notice you've wrapped your house with polyethylene. You realize, of course, that you are going to have trouble with this because, in the wintertime, that polyethylene is going to get cold and we're going to get condensation on there — your wall is going to get wet — it's going to rot — and your house is going to fall down on you." This fellow said, "Yes, I know that, but if you look out the back there, I've got a hole dug, and I'm building a new house. In the meantime, I have to make this house liveable — and that was the cheapest, easiest way to make it liveable" (putting polyethylene around).

Well it makes snese — if you want to make your house airtight, what better way than to go to Mr. Glad and get him to build you a garbage bag for your house. You tie it around the chimney with one of his patented ties, and you,ve got the tiger by the tail. Well, what's wrong with that? What's wrong with it is if that polyethylene gets cold, you've got problems. But if we want to make something warm, what do we do? We put insulation on the outside of it. When its cold outside, I don't eat my down-filled jacket for breakfast, I put it on, and so I keep myself warm, and the breakfast I eat to put inside. Now, what he's done is exactly that — we've done this with a number of houses in Saskatchewan: here's one example. We wrapped this house right from the top plate, right up at the top, right down to the foundation and sealed it all the way around with 6 ml. polyethylene and glued all the joints together to try and make it air tight. Then we went outside and put insulation around there, and wrapped the whole house in insulation, and then put a new finish on it.

This is what Dennis Rogoza was talking about here in terms of doing the retro-fit all at once. You have to have a reason for this, and one homeowner had a very good reason. He put this addition on his house and he had a reason because the heating people said "well, you need a new furnace", and he said, "well, what's wrong with the one that I've got there?". "Well, it isn't big enough for your new house. Well, the solution, we'll put in either a new furnace at $1,200 or a bigger furnace at $1,200 — take your pick." And so he said, "well, I can insulate my house for $750", (and it needed new siding anyway) so he did this. He insulated his house — made it so it didn't require the furnace, and it's already paid for itself, and he's got a much more comfortable house. Now, I think that the error he made on this was that he was still unable to seal that vapour barrier at the top of his roof, all the way around. My suggestion now would be that he should have done the roof at the same time he should have gone right over the top of the roof with the polyethylene, right over the roof with the strapping and the insulation, and then put a new roof system on it at the same time. Here's another example. This is a brand new house and this builder did it exactly that way; he put the walls up, he wrapped the exterior of the house with polyethylene, made a new wall outwards of that to which is hung now, from the rafters, and there's two layers of 6 inches of insulation going on the outside, a foot of insulation outside of everything and he's got the house real super-tight. The house essentially doesn't need any heat.

Well, we've got a better techniques of doing that now. There is a very nice little booklet out, published by the provinces of Saskatchewan, Alberta, and Manitoba, that shows these details and has been printed to show people how to do this. It is getting a lot of notice. The technique consists of the double-wall houses which we've designed. In this case, the inner wall is the structure, the vapour barrier is behind sheathing and this is built up on the floor system which is set back so that you have lots of insulation over the floor system so you can bring the vapour barrier past the floor system from the lower floor. The advantage of this is that you've now got your vapour barrier on the outside of your studs so your stud space on the inside can be used for running your electrical wires and so on. You've got that vapour barrier now 3 1/2 inches away from the people who put the drywall on, and that helps, you know. It really does. Then you go outside, and you put insulation in from the outside, and then the siding, and so on, going on.

We have been testing houses and we know that these houses are very, very much tighter using this technique than houses built in a more conventional sense. We use pressure-testing equipment. We have tested a lot of houses and here's some of the data from houses that we have tested. Houses built back, pre-1945, we find are very, very leaky about 10 air changes per hour at 50 Pascalles. Houses that were built between 1946 and 1960 are considerably tighter but still about 4.5 air changes per hour sort of thing. Houses that were built between 1960 and 1980 are considerably tighter, and the average here is about 3.6 air changes per hour. As for low energy houses, we are finding these are a much tighter group and air change rates of about 1.5 air changes per hour. Now, when we take that last group and break it up into another smaller group — into two groups: we have what we call the doublewall houses. Then we have singlewall houses in which the vapour barrier is applied directly behind the drywall. We find the singlewall ones are exceptional examples of building house. Generally, the builders using this technique are unable to achieve a high sort of level consistently and they are up inthe 2 — 3 air changes per hour range generally, we find the double-wall-house is an exceptional house. In fact, one builder in Winnipeg has built about 20 houses now. They are exceptionally tight. He has his crews working on a competition to see who can build the tightest house. He has houses which are so tight they are almost off scale, they're almost below zero. It's just amazing, and he's doing it consistently.

9 Energy Conservation Technology In New Housing

Doug Carl:
Former Director of the Energy Conservation Section of the Ontario Ministry of Energy.

I think the subject of energy conservation technology as it relates to new housing is both an interesting one and a provocative one these days. Most of us I think have seen quite a proliferation in the last couple of years of energy conservation technology, particularly if one interprets technology to mean both hardware, such as new heating systems, and methodology, which might involve the proper installation of a vapour barrier or an energy management approach to a building operation.

Generally energy conservation technology tends to respond to increasing fuel costs, to regulatory requirements, and finally, to market place demand. Therefore successful energy conservation technology is always faced with demonstrating some cost benefit relationship to consumers. It is obvious technology applies to the building shell, the building system, and the building operation, and certainly for both single family and multiple unit residential dwellings. It is also interesting to note that technology tends to be effected by the law of diminishing returns in energy conservation. By that, I suggest to you that the initial steps are always the easy ones, the obvious ones with the greatest level of payback, and, as those steps are carried out, the incremental energy conservation measures tend generally to show a reduction in the return on investment. The relationship to increasing fuel costs tends to be the driving force behind energy conservation, technology, development, and commercialization.

We at the Ministry of Energy are involved deeply in the housing technology business, primarily with our associates at the Ministry of Municipal Affairs and Housing, under a joint program which is called "The Housing Energy Management Program". I think we've been jointly involved there in a number of successful demonstrations with respect to new energy conservation technologies, again, both system and methodologies. The objective always is to work with leading edge technologies and get them developed to the point of commercialization.

We have as well in this province a bilateral agreement with Ottawa, known as the "Canada-Ontario Conservation and Renewable Energy Demonstration Agreement" which is a $58 million program that we operate to demonstrate new and promising technologies in the energy conservation and renewable energy fields, again to promote their commercialization on a broad scale through the economy.

G.O. Handegord:

Co-ordinator of Building Technology Research for the National Research Council in Ottawa. He is a professional engineer who formerly worked at the Prairie Regional Laboratory of the NRC.

My job has largely been to concern myself with the energy transfers in buildings. I leave the relationship of this to the costs and economics to those who know something about costs and economics.

The amount of energy that is required to maintain an acceptable environment in houses is determined by three different but inter-active components in the system: the characteristics of the building enclosure and the internal partitions, floors and compartments that make up the building itself; the characteristics of the energy-producing energy transfer, the distribution and control elements that comprise the equipment and services in the building; and finally, the characteristics of the occupancy and the method and use they make of the components and the equipment in the building. Our tendency in the past has been to address each of these components separately, and to develop guidelines or norms that really oversimplify the actual situation.

Construction is a tradition-based industry where the inclination is to do things the way they were done in the past because they worked. If we don't understand why they worked, or how they interrelate, we have great difficulty in predicting what will occur if we change some part of the system. Every effort thus should be made to utilize the experiences of the past if only to sort out what we know and what we don't know. Trial and error methods are best replaced by trial and evaluation techniques.

The design and construction of the walls, floors, roofs, and windows that make up the house envelope offer one basic means to control the energy used to maintain a satisfactory environment within the building. Heat transmission through these opaque elements is primarily controlled by insulation. The thicker the insulation, the lower is the rate of heat loss or gain.

In Canada, wood frame construction is essentially the rule for low-rise residential buildings, and it has the inherent advantage of providing a space which can be filled with inexpensive thermal insulation. In wood frame roofs, incorporating an attic space, no practical restriction for insulation thickness is encountered. However, when we come to flat wood frame roof construction or some cathedral-type roofs, a practical insulation thickness is imposed.

One accepted method of providing additional insulation for wood frame walls has been use of insulated sheeting boards of foam plastic, mineral fibre, or wood fibre. Incremental insulation increase might also be afforded by the use of similar rigid insulated boards used as backers for metal or plastic siding, provided it's not set out on strips to ventilate behind it. Securing these materials — that is, the exterior finish — to the soft insulated sheathing boards does present some difficulties because one wants to avoid the high thermal conductivity fastener such as nails. In some cases, wind poses a problem when you simply nail into the sheathing and not into the structure. Now, in some regions of Canada, nominal 38 x 140 mm. (I think that's 2' x 6') framing members are used to obtain an increased thickness of thermal insulation in walls. The framing members extending directly through the insulation are thought to constitute a significant thermal bridge. One might go to other schemes such as interior or exterior strapping in order to create the same space for the insulation.

The increased thickness of low-density insulations, particularly if there are spaces left, can promote convection within the insulation and give rise to inderterminate overall R values. Double stud wall construction or staggered stud wall construction, truss studs or cross-furring with furring strips or other methods are used to increase the thickness of construction in order to provide space for thermal insulation.

The difficulties inherent in determining the real thermal resistance of this assembly are being addressed in experimental studies by our division and others to try and provide practical co-efficients.

The emphasis on improving the thermal resistance of the frame super-structure has often left a question of insulating basement walls in the background. Clearly, they should have a thermal resistance above grade at least equal to that of the super-structure. Where the basement is to extend some distance above grade, preserved wood foundations would seem to be advantageous since they provide a space and a connection from the footing to the structural floor system. Concrete or masonry foundation walls are best insulated on the exterior to avoid undesirable lateral conduction and the convective affects of hollow masonry.

When we come to Eastern practices of brick veneer, we have difficulty in supporting the brick veneer and making the house flush, we can use a support or we can accept the fact of a flashing to extend out over the additional insulation.

It may be difficult to predict sub surface heat losses accurately because of the many variable influences of ground water, soil type, and moisture contents, snow cover, and the location of adjacent buildings. These factors determine the environment outside the basement in a rather unpredictable way. At present we are making studies in houses across the country using such devices as so-called thermal boxes to measure the heat flow and the results indicate the pattern that is generally constant for any particular season.

At present, it seems reasonable to suggest that low grade masonry walls should be insulated down their full height, preferable on the outside, and this could involve either a closed cell plastic insulation that is water resistant or a draining type such as mineral fibre that connects to the drain. These types of insulation and others are being investigated by a number of agencies across the country at the present time.

A two-stage approach to insulating basements to allow the contractor or original home builder to put down insulation partly on the outside has been suggested by one of my colleagues in Saskatoon, Jim Hamilton. He suggests the insulation be applied on the outside and when the home owner wants to finish his basement and can assess the then economics, he can decide to insulate it the rest of the way on the inside to any thickness he wants. It may also be important in some instances such as the danger of frost-susceptible soils to extend insulation outward, not so much because it would reduce slightly the heat loss from the basement but rather to keep the ground next to the foundation above freezing.

The exterior colour of opaque portions of the envelope can influence the radiant heat exchange with outside. Solar radiation absorbed by the cladding during the daytime will raise its temperature and reduce the rate of heat flow through it. Similarly at night, radiation through a clear night sky in winter will lower the temperature of the outside cladding and increase its heat loss to the outside, increasing the temperature difference across it. These affects however will be less and less significant the more and more insulation you put in these opaque elements. Solar radiation is of greatest importance to heat transfer through transparent elements — the windows and skylights. The characteristics of the surfaces in the window assembly can determine transmission properties as well. These are difficult to predict because a great portion of the resistance of a window or an element having low thermal resistance is dependent on the inside and outside air films that attach it.

Windows are the main source of solar heat and provide an advantage in winter, but a disadvantage in summer. They also are tied in with the affect of the thermal storage of the building inside. For houses in most parts of Canada, I should say that simple shading devices can be used to shade the window in the summertime and to allow most of the energy to enter as radiation in the wintertime. For houses in most parts of Canada, double glazed or triple glazed windows facing south offer a net heat gain in winter when considered on a seasonal basis. This shows that the south, south-west and south-east windows are roughly on a par, when they are triple glazed as far as the net heat gain during the wintertime is concerned. Also, since the windows are generally high conductivity materials, there are devices such as simple drapes used to increase their thermal resistance when there's no solar radiation or one doesn't want to see through them. I would caution you however, that by putting drapes on the inside, you effectively may increase the resistance value, but you effectively lower the surface temperature of the window, so you may encounter problems in the morning, and if they're sealed double glazed units and the insulation is very effective, you may get breakage of the windows because of thermal shock.

In terms of air leakage through the building enclosure, the double wall construction such as have been promoted and used extensively in Saskatchewan and the cross-furring method in the Mark 11 project attempt to improve the airtightness of the envelope by placing a polyethylene barrier at a location where it is not likely to be penetrated by electrical services. The double wall constructions in Saskatchewan have the added advantages that the continuity of the air barrier is carried over the floor system on the warm side of the insulation, whereas in the Mark 11 it was carried outside, the insulation on the inside. This presupposes the possibility of condensation at the location where the header is, and tried to utilize a dynamic arrangement whereby we put a vapour barrier on the inside as well but did not seal it. We measured the moisture content of the box header beam, and this was then covered by insulation and then a vapour barrier. So far the system seems to dry out effectively in spring and summer.

There were a number of studies undertaken to determine where unintentional leakage openings occur. Many are found where services such as electrical wiring go through the ceiling or walls where plumbing or duct work goes through the ceiling or the exterior walls. Another major leakage opening occurs where the crack develops — because of shrinkage of wood between the members and the interior cladding.

Holes in houses that are created by services and by shrinkage constitute a large number of leakage paths through the whole system which are very difficult to determine except by our modern techniques. In an effort to cover these shrinkage cracks, Canada Mortgage and Housing Corporation required, some years ago, that polyethylene barriers be placed over top of partition walls in order to seal them. Then this polyethylene was connected to the sealing vapour barrier. This was done not only at the upper portion on the upper plate, but also where the partition wall intersects the exterior walls of the house.

Airtightness of the upper ceilings and the exterior walls might also be more easily achieved with plus roof construction where we could apply either the interior finish or the vapour barrier or both before the interior partitions are put up. This is being tried in a number of locations.

One of the difficulties with these kinds of approaches is that they interfere with the normal sequence of operations and jurisdictional requirements of various people. It so happens that in most parts of the country, steel studs don't do this because the steel stud installer also puts the drywall on and does the taping. This offers the potential for really going back to the original Illinois approach to the use of truss construction.

Most current approaches to airtightness involve the use of polyethylene film and this has been successful. It's not without its difficulties when one doesn't know what they're doing such s dealing with corners with unintentional openings, where the foil has to be repaired or crossing together.

One idea of using the interior finish as an air barrier was applied in the HUDAC Mark 7 houses in Vancouver, where they used 3/8" plywood as the interior finish and air barrier. Currently, a method which follows the same principle but using gyproc interior finish of 1/2", and then using 1/2" plywood to bridge the joint at the floor junctions is being tried.

There's also some reason for re-assessing the way we do electrical wiring in houses, particularly the utilization of ceiling fixtures and wiring into the attic space. The desire for concealed wiring in these exterior enclosure elements and the walls can result in many openings in the air barrier. If surface mounted fixtures were used instead, a marked improvement in airtightness of the envelope might well be achieved. One of the most common oversimplifications to my mind to date has been the direct linking of enclosure airtightness, measured with an exhaust fan apparatus, with the air exchange rate that is going to occur in the house in the future — and with ventilation, and also with air quality. This is a quantum leap as far as I'm concerned, without understanding what's going on. Statements that houses have become much tighter in recent years due to the increased use of thickness of insulation are neither technologically correct nor borne out by the measurements that have been made.

Published values suggest that the enclosure tightness on the average has remained about the same since 1946 give or take a little, and the differences are related more to the type of house or to its location. By that, take a two-storey bungalow, split-level in the country. The average total leakage for the enclosure, based on pressurization and evacuation tests, on the average again, is about .08 to .1 square metres or about .8 to 1 square foot. Now the latest direction of air leakage through these cracks and openings can depend on their location, but more particularly on the direction and magnitude of the air pressure differences that cross them, created by natural forces such as stock effect in wind, and the action of fans, chimneys and blowers.

Perhaps the most significant and least recognized is the affect of the chimney and the draft control system employed by conventional fuel-fired furnaces. The hot gases in the chimney are light and less dense than the gases in the house or outside, and tend to rise, creating a negative pressure inside the house or a draft. This draft draws in air through the burner and also through the barometric damper in oil-fired systems or the gase divertor in a gas-fired system, each of which serves to control the draft over the fire. An operating chimney will exhaust air at a rate of perhaps 40 metres per second or more. This can draw in outside air through all of the openings in the enclosure, including the ceiling, and may even counteract the effect of outward movement of air through walls in the leeward side of the house under average winds.

In a house with no operating chimney, such as an electrically heated house, the pressure differences across the envelope are quite different and only some of the leakage openings will be involved as air inlets, the others as air outlets. As has been observed, the actual air exchange rate in electrically heated houses is lower than in fuel-fired houses, not because they are any tighter, but because they have no operating chimney. The excess volume of air that is exhausted up the chimney for draft control purposes in conventional furnaces and boilers is reduced or eliminated in high efficiency or condensing type fuel-burning appliances. The operational characteristics of the house with these appliances will therefore be closer to those of an electrically heated house, not just because they have improved combustion efficiencies, but because they are not exhausting the added amount of air that has already been heated to indoor temperatures.

It should be appreciated that conventional fuel-fired systems have provided a form of ventilation system, with fresh air leaking inward through openings in the building enclosure and being exhausted, with the products of combustion, up the chimney. It has not been thought of in this way, however, but rather lumped into the so-called "seasonal efficiency" of the heating unit.

Since 1950, in the Prairies and in the Maritimes, the outside air intake system augmenting the return air system has been augmented by this outside air intake which is insulated with a damper, in some cases to control the rate of outside air supplied to the house. Measurements using trace gas techniques or inferred from measurements of the indoor environment in fuel-fired houses with conventional systems indicate that on the average a ventilation rate of about one-half air change per house was provided by this simple system in the middle of the winter. The outside air intake adjustment was used effectively as a means to allow the occupant to adjust the ventilation rate to control humidity levels in the house. It was a very effective marketing tool by large house building contractors in the West, and cost them about $5 a house.

This rate of ventilation I spoke of is about equal to that which is currently being recommended for residential occupancy in the 1981 standard for ventilation and acceptable indoor air quality. If this represents what we regard as the optimum condition or required condition, a substitute system is going to be required for houses with no operating chimney, hopefully a system that incorporates a means for heat recovery that was not possible in the simple systems of the past.

One system that's being developed offers an exhaust fan and recovers heat from the exhaust air using a small heat pump. A simple air inlet can augment any leakage openings in the exterior envelope to provide the fresh air inlets as long as the air flowing in did not affect the comfort conditions in the space or pick up contaminants such as might be in the exterior enclosure or in the outside air. Air-to-air heat exchangers, however, require that the house enclosure be tight in order that the air coming into the house and the air being exhausted can be brought together so that the heat can be exchanged between them. The implications of this should be recognized before promoting the use of air-to-air heat exchangers in the house which cannot be made tight or where a conventional fuel-fired system is in operation unless it is in a separate enclosure.

There are also other means of ventilation which can be used to control the levels of contaminants, dehumidifiers, absorption or dehumidification devices, which have much different energy use characteristics than ventilation. It's also necessary to consider the source of contaminants in all buildings and to recognize that capture of the contaminants at source in the exhaust is a method. For example, control of the direction of air leakage for contaminants that exist in the exterior enclosure or from outside air require different techniques which may be inconsistent with other requirements in the house.

In the final analysis, I might mention that one of the problems of the non-operating chimney or a gas-fired chimney which has a low heat is that when you operate an effective exhaust fan or the dryer, you well may overcome the draft of the chimney and pull the gases of combustion into the house.

In the final analysis, it's the occupant that determines how the house is operated, and what ventilation rate, solar gain, internal energy input and equipment operating schedule are followed. About all the designer, developer, builder or regulatory official can do is to ensure that the house is capable of being operated to meet some predetermined energy use requirement under a specified operational schedule. If our objective is to conserve energy, all of the participants have to understand as much as possible about the subject and to make thoughtful judgements as to the technical and economic implications of their ideas and actions. Webster's definition of technology is "the application of knowledge" — we all not only need to know more, we also have to apply our knowledge to understand existing systems, to develop new systems and methods, and perhaps most important of all, to fairly assess, evaluate and communicate information on the performance of the systems in the real world.

Each house is different, and similar homes are invariably occupied by different people. It would be preferable to concentrate on determining the reasons for the variations in field performance, rather than trying to bring a complex, interrelated set of systems to some common denominator for the sake of simplicity and uniformity. And one thing we shouldn't forget; that the occupants are changing.

Hugh Heron:

President of Heron Homes Ltd. he is the builder of the Maple Ridge Development in Pickering, Ontario, and of the energy-efficient Heathwood Development in Scarborough, Ontario.

The year 2001 seems rather distant and futuristic. Well, believe me, 2001 is just around the corner. It's only 20 years away, and think of how far we've come in the past 20 years in technology. However, in our business, the future is not only around the corner, it's now. It's building the most contemporary marketable structure possible and it's marketing in an environment that changes from moment to moment. It's pricing in a highly competitive marketplace. It's going on to the next project and repeating the process over again, constantly adjusting to ever-changing technology. That's why a few years back, at Heron Homes, we started to look at energy conservation features.

Back in 1980, at our Maple Ridge project in Pickering, we wanted to test the water to see if the market was becoming energy conscious, and if so, were they prepared to put their money in it? So we conducted an extensive interview with perspective buyers, people who said they were in the market for a home. The results of the interview showed most people rated energy saving features well behind more cosmetic features. The majority said we'd pay for extra, upgraded insulation and thermal pane windows but not for a heat pump which, according to our calculations, provided the greatest savings. More people said they wanted air conditioning than those who wanted a heat pump. Half again as many said they wanted a humidifier, as those who wanted a heat pump. Almost as many wanted something as insignificant like an intercom as wanted a heat pump. Crazy.

What it all boiled down to is this: the consumer indicated little real interest or knowledge of energy efficiency. The consumer had a poor understanding of where energy savings could be realized and there was a definite unwillingness to pay for energy efficiency. There was little awareness of heat pumps and their benefits. Our conclusion was that we couldn't get our consumers to pay the extra price for energy conservation.

In the face of all this, our Maple Ridge project was just a bit too early for us to push for a full energy conservation package. Just in case, we did offer upgraded insulation as an option. Only 5 people out of 288 homes took the option. Our research hadn't been wrong. The consumer just wasn't ready for energy conservation.

In 1981, when it came time to do our Heathwood development in Scarborough, we felt it was time for a full energy conservation package. We wanted to offer our customers the houses they would need for tomorrow today, even if they didn't know it. At first I thought we were a little bit crazy to try it, especially when I thought back to my own experience with a heat pump in a house I built and lived in in 1977. To put it bluntly, it didn't work.

So why am I a promoter and champion of heat pumps today? Because Bob Warner, manufacturer of the York heat pump, heard me state that I'd never again use a heat pump, and they took up the challenge. They were able to make me a believer. They were able to prove to me that heat pumps do indeed save energy, not only effectively, but efficiently, to the point this year of saving up to $375 on the annual heating bill in one of our Heathwood homes compared to a similar sized home without the heat pump. Compare these savings to upgraded insulation which, according to our research, saves us only $30 per heating season above the standards we'd be putting in as normal. So Bob Warner was able to prove to me that heat pumps, in combination with other energy saving features, were the most viable solutions to energy efficiency in a new home.

For those who aren't quite sure what a heat pump is, let me give you a simple explanation that even I, as a poor, wee boy from Glasgow can understand. Even when it's cold outside, there's heat present in the air. A heat pump extracts this heat from the air outside and transfers it inside the home and into the heating system where it's distributed to the various parts of the hose. It's that simple, and it can work with an electric, forced air, gas or oil furnace.

The reason why a heat pump is more efficient than any other heating unit is because you get more units of energy out of it than you put in it. That means you get 8 units of energy out for only 4 units you put in based on a seasonal performance and as high as 12 units of energy based on the most efficient performance of the heat pump. You're actually getting more out of the unit than you're putting in, making it the only heating unit where you get more than 100 percent back. As I said, it is one of the few things in the world from which you get more than you put in.

Now, we're not stupid. We're not going to jam something down a consumer's throat and lose a house sale over it certainly not in today's economic madhouse. We were so sure it was right we had further dialogue with our heating and cooling equipment suppliers, Derry Contracting, and Bob Warner. We talked about the practicality of heat pumps, and the awareness people have or, more rightly, don't have of heat pumps. We knew home owners would be interested in saving money on their heating bill. We knew the viability of heat pumps but we had to communicate with the home buying public.

Bob Warner agreed on a joint public relations and advertising campaign under the direction of our marketing department. Our advertising agency was able to convince me I should be the spokesperson in a special radio campaign. You know, I certainly don't have Lorne Green's rich, deep voice or Gordon Pinsent's acting skill (although I met an old friend there, Jim Morris, who would probably disagree with that) or even Al Waxman's sense of humour. Squeaky voice and all, it was generally agreed that sincerity and honesty combined with good, helpful, money-saving information from a crafty old Scotsman would get the message across.

RADIO MESSAGE

Announcer: "Hugh Heron, President of Heron Homes, installs the York heat pump in all his fine homes in the Heathwood. Lots of other builders don't do that . . . yet. We asked Hugh if that made him a pioneer."

Mr. Heron: "I am not a pioneer. God love them — I love pioneers, but I'm not in the business of pioneering. Putting something into our homes that, down the line, some poor purchaser after the one year warranty, and I'm getting them, finds that what was an emotional decision on my part doesn't work."

Announcer: "So, you don't make emotional decisions."

Mr. Heron: "I make hard-nosed decisions. Will this save my purchaser money?"

Announcer: "And the York heat pump is a money saver?"

Mr. Heron: "There's a real saving — not an emotional saving, but a real saving in dollars and cents, like a saving of up to thirty cents on every dollar. That makes me a believer."

Announcer: "Hugh Heron. He makes a York heat pump standard in every fine home in Scarborough's Heathwood because Hugh demands the best."

I'm sure that you'll all agree that, while the voice may leave something to be desired, the message was right on. Combined with our print advertising and our energy displays in the sales pavilion, we were able to convince people exposed to our communication material that heat pumps were desirable and worth the investment. Follow-up research showed us, after exposure to our ads and displays, 68 percent of the people surveyed felt that heat pumps were essential, a lot closer now in ratings to upgraded insulation and thermal pane windows. We got the message across. With careful research into both the product and the consumer, and with a well planned communications program, we got excellent awareness of energy conservation. We pulled it off. At least, we pulled it off with the consumer. Unfortunately, while saving energy may win the hearts of your customers and of the government, because we were cutting the use of gas some 70 with energy efficient heat pump systems it didn't justify the gas company putting down pipes into our development.

What a development. They had a shortfall of $58,000 which someone had to pay, either the gas company, the developer, the home owner or taxpayers through government subsidies. You know, I don't really know what the answer is but I do know that if I impart any information to any developers out there, it's this: whichever energy conversation measures you adopt in your projects, be sure you have extensive dialogue with your energy resource people first. Check out the implications of complications. Your heart might well be in the right place, but unless you do your homework, you could end up with a big problem.

You know, I started as an apprentice 29 years ago and today I'm President of a major Toronto home building company. People tell me I have a love affair with every house that I build, and I've probably built over 7,000 homes in the Toronto area. Well, maybe I do have a love affair but, because my name goes on every house that I build, I want to bring the best of what's available to my customers. That's why I'm so interested in energy efficient heating and cooling systems. That's why I'm so interested in new types of energy conservation, and that's why I'm serving as a chairman of the steering committee for the new passive solar energy housing demonstration for HUDAC and the Ministry of Energy.

Before I commit myself and my company to any new conservation systems for a project, I'm going to ask myself three basic questions and I'm going to make sure I have the answers before I take it on. One, does the system represent significant savings? Two, are there any complications and thirdly, probably the most important one, is it marketable?

Let's look at each of these questions more closely. Does the system represent significant savings? Our experience tells that consumers are only going to pay for energy conservation features that save them money. Today, my money's on the heat pump. As far as real savings from our experience, none of the other systems available today match the package we were offering in the Heathwood homes. Yes, there's lots of new techniques. Solar energy is one we hope we can make cost efficient, but until we do, it just isn't worth it for the consumer.

The second question I'll ask myself is are there any complications? Well, we sure learned from past experience. We need a lot of input from the energy resource companies before local commitments are made. As I said before, I want to avoid any major surprises, especially extra costs.

Thirdly, is it marketable? It's not easy to do that when you're the only one who's installing energy saving features. Why? Because energy conservation in new homes costs money and time. You put energy cost saving features into a home and your competition doesn't, your home costs more. Unless the consumer wants that energy saving, you could lose sales: that's business, after all.

Maybe building codes have to be changed so all of us would have to install energy efficient equipment in homes we're building. That way the energy efficient builder doesn't lose his competitive advantage. Sure we've had success with selling energy efficient homes in Heathwood, but we had to spend a lot of our time and money to sell that energy conservation. Remember what our research showed us; when consumers were not aware of energy saving equipment and what it could save, they wouldn't pay the extra price for energy conservation but when they were aware, we did get some positive response. Heron Homes has proved that if an energy saving system is a real money saver, and it's well communicated, awareness and interest can be developed. We're still communicating to our potential customers and here's the latest commercial from our Fall, 1981, campaign.

2ND RADIO MESSAGE

Announcer: "We're here again for another discussion with Hugh Heron, President of Heron Homes. Hugh, what do you think about Canada's new energy pact?"

Mr. Heron: "I think it's time we all packed up and moved to a warmer climate."

Announcer: "No, seriously."

Mr. Heron: "John, I'm serious. It means that we're going to pay in a lot more than we expected for energy in the future."

Announcer: "Well, what's the answer to that?"

Mr. Heron: "Either an oil well in your backyard or more efficient homes like the ones I've been building in Heathwood in Scarborough."

Announcer: "The ones equipped with the York heat pump?"

Mr. Heron: "Exactly. Our figures show that the York heat pump saves you up to $375 per heating season right now, and by 1986, that could be as high as $1,000."

Announcer: "And every home in the Heathwood is equipped with a York heat pump?"

Mr. Heron: "Sure it is. It draws heat from the air and puts it in your heating system, and in the summer, it gives you air conditioning as well."

Announcer: "So air is the key to it all?"

Mr. Heron: "John, it may sound like a lot of hot air, but believe me, it works."

Announcer: "Well, that's a good enough reason to look for a home in the Heathwood."

Mr. Heron: "And it's an even better reason to live there."

You probably notice the tone of that commercial, and I really am perturbed. We've had success with increasing interest in energy savings but I'm only a builder, a local builder, and I'm able only to reach a small portion of home buyers. I'm telling you, home owners are going to be in for the surprise of their lives a few years down the road when energy prices go sky high. Look at this, from the Department of Energy, Mines and Resources: heating oil, up over double and only 5 years from now, natural gas, up more than double in only 5 years.

You know something, people don't realize what's going to happen to them. You know, maybe we're research happy, but we conducted another survey just a few weeks ago and asked this question; 'From what you may have seen, heard or read about lately in the news and using last year's heating costs as a base by how much do you feel your total heating costs will increase by 1986?' Well, look at it. Six out of every ten people thought their heating costs would go up only 60 or less — six out of ten — and only one out of every ten believed heating costs would go up 100 or more. The fact is that heating costs are going to more than double in only 5 years, and somebody is not getting the message across.

Home owners deserve to know what heating is going to cost them in the future. Let's face it, people have to be told in simple, plain talk, not fancy chats and complicated numbers. They have to be told the energy crisis isn't going to go away. The rising costs of fuel are not going to suddenly stop and reverse themselves. They have to be convinced that the need for better and more efficient heating systems is here for good. Once consumers are aware of their need for energy conservation, don't you think they're entitled to the most efficient systems technology can provide? It just isn't going to happen unless we all work together to make it happen — government, manufacturers, developers, builders, the public.

We've all allowed a serious communications gap to develop among everyone concerned. Everybody talks about energy conservation, but there's really not been much action. We've got to get it going. Government, let the people know the facts. Only then will they truly support energy conservation. Again, maybe we need to put it into the building codes so that everyone has to participate. And manufacturers, builders, developers, let's support each other. We certainly need each other's expertise. Builders can't do it alone, technologists can't do it alone. We have to respect each other's abilities and contributions. You know, builders may think that technologists are too theoretical but have we taken the time to explain to them some of our practical problems? On the other hand, technologists may think that builders are too damn time and labour oriented but have they taken the time to really listen to our side of the story? Have we all, as a group, communicated our problems to the government?

I don't care whether you put up walls or whether you use those walls to hang up your PH.D., or whatever other degree you've got, it's a matter of common sense and good communications. If we all want to enjoy the year 2001, we certainly owe ourselves and our country the duty to do everything within our individual power to save the irreplaceable fossil fuels and we have to start doing it now.

Keith Funk:

General Manager of Concept Construction, a company specializing in energy efficient construction, products and research, based in Saskatoon, Saskatchewan.

We operate a very small general contracting company in Saskatoon. We can't pride ourselves on thousands of houses, but we can pride ourselves on building houses that heat for 5 to 15 percent of the average energy consumption.

It's a short history. We began our company through the design renovation field. We have built only energy efficient constructions and, in the past 4 or 5 years, we've built only passive solar buildings. The approach we've used has been founded through research in Saskatchewan and we'll go into that in detail.

I think I'd like to sum up my presentation to you by discussing something we're all aware of and that is that the consumer for housing in the future is going to be reasonably energy aware. Hugh's market data bears truth with what we've been doing in Saskatchewan. We're coming to a point where the building industry is getting to be outdated relative to the demands of the housing market. Though the field at this point is just at the very tip of the iceberg, I think what we have below the surface is a tremendous market and the challenge of satisfying that market is the basis of my presentation today.

Change is never easy. Sometimes we look around a pretty complicated society and assume things have been and will be as they are. This assumption is fairly well-founded. It makes for nice conservative development in our society and keeps things from being essentially fractional or difficult to live in. But there are some things which can't be ignored, and the cost of energy and the impact of that energy cost on the consumer is something we should rally behind and innovate in anticipation of need.

The Canadian shelter system over the last 15 or 20 years has been essentially unchanging. Previous to that, we innovated good shelter ideas for Canadian climate and Canada can pride itself on having the best shelter, pretty much, of any settled nation in the world. The situation we're under now is that we have a challenge to improvise better shelter so that the Siberian environment many of us live in and even the temperate environment the Toronto and Niagara Basin live in, is something that's going to have to be considered sharply or we'll be moving to Florida.

The mandate of designing energy efficient housing was the fundamental premise we started Concept Construction with; we decided we would attack the problem head-on regardless of the market acceptance. We decided the only way to foster the development of the history of Canadian architecture is to stick your money on the line, risk your entire work effort and put houses on the market that do satisfy the ultimate in super-energy efficient housing. Cost effectiveness is a fundamental part of any development or, in fact, any offer that you can make in terms of conservation and that's always been the premise that we used as a guideline when we build housing.

Initially, we thought we had to go wild and we built very large amounts of south-facing glazing in our buildings and, essentially, extremely energy efficient housing. We've learned some incredible things. The first house we built would go through a winter day of -45 and would be able to be heated to 95F inside with no backup energy. That took a lot of people by shock, the National Research Council included. All of the statistics for solar radiation were based on horizontal readings and in fact, in Saskatchewan, a vertical south-facing surface gains more energy through each square foot due to the reflection from snow cover than a horizontal surface does in the summer, so there's a remarkably powerful amount of energy.

We spent the last three years learning to balance and moderate that energy to the best buy principle which is supplying enough solar capabilities in the building, balancing that to the heat loss of the structure and still being able to go to the consumer to offer a building which is within the correct cost frame-up.That means it costs you less money to own and operate than if you didn't do it in the first place. That's been the premise by which we've designed all of our housing.

Today we design and market housing ranging in sizes from about 850 square feet, a building like I live in, to buildings in excess of 3,500 square feet with prices ranging from $45,000 up. Each of these buildings can be assured of running on about 15 percent of the average energy consumption cost so the cost difference between the marketplace for conservation housing and standard housing is not that great in Saskatchewan.

The principle of passive solar heating has its foundation in energy conservation. You only have to supply as much energy to a building as it loses, and that's true whether you're going to any particular type of system. The relationship of controlling the structural heat loss is always attacked. First of all, consider the first building that we built. And I mentioned, it had fairly tremendous amounts of south-facing glazings and very limited heat losses. It was a very nice and warm building. The taking on of the structure and designing it for passive solar energy capabilities went through the process of designing an energy efficient structure which, of course, had very good levels of insulation in excess of twice the construction standard and very good air vapour barrier standards somewhere around 8 or 10 times more airtight than standard construction.

Our buildings eventually developed toward what I consider a general contracting approach to energy efficient housing. We are a general contracting company and we field our work out to the normal building trades in Saskatoon, so it was very important to design housing that was built along normal construction standards. This gives two benefits, it's easy to build and it's very inexpensive to construct. It uses essentially standard construction methods. The aspect of taking care of the seal within an energy efficient building, such as a sealed vapour barrier, has been handled with a similar system to an air-to-air exchanger.

We take great pains to make sure the furnace room is an absolutely air-sealed unit within the building and, therefore, doesn't draw on the chimney effect in the house. We hook the air exchanger, which extracts about 70 of exhausted air to pre-heat the incoming air, to the humidistat which is mounted in the home. The humidity generated by the family, in fact, humidifies the building. Anything in excess of that is dumped, and the heat in the air that is dumped is used to recover the energy through the. The benefit of course is that it's nice to live on the Prairies and not have a really dry house so you wake up in the mornings with a runny nose.

The passive solar system is something we've been working on for about 6 years. The best buy principle, a good principle in terms of any marketing economics, has always been the fundamental premise that has guided us.

The aspect of designing a passive solar building has been taken on so that the gains could be maximized, the recovery of the energy could be used through the nighttime and the loss is minimized through the nighttime.

To this end, we have developed an insulating window system which just recently has been tested out at the Mechanical Engineering department at the university to an R12 value. It operates automatically. It retracts when there is radiant energy available to warm the home and descends when the energy is no longer available. The type of unit we've come up with is something that has been based on a general contracting procedure.

The designing of these buildings so that they could operate on a solar system was done so that the owner in the home had nothing to do. He could walk around with his hands in his pockets or go to Hawaii and the building should operate as it was designed to do.

There's a summer/winter switch inside the building. It operates on the winter cycle to allow gains during the daytime and, of course, insulate for losses at night. The summer cycle insulates from the gains in the day and, of course, withdraws at night to allow the building to cool. We've had people complaining that our houses were too cool in the summer without air conditioning. It's possible to build a very efficient building and allow this cycle to carry it over.

We also supplement the carry-over system with a thermal storage wall. The thermal storage wall is usually one metre high and goes across the bottom half of the south-facing windows. Its major responsibility is to behave as a flywheel within the building. It takes on energy during the day and radiates that energy when the insulating curtain prevents losses at night into the home. That keeps the building operating on a 24-hour cycle. The cost efficiency of this type of system has been proven out through other contractors picking up our work.

We deal our building designs out, and other people pick up the designs and the products and produce our housing and that's been the primary purpose of the company in the last little while.

The first impression of this type of system is that it's a reasonably complicated thing to contract, and that is something we've worked very hard on over the last few years. It's essential to design a building assembly procedure which can be used in the mass market. As I mentioned, we pride ourselves on designing housing that can be afforded by the general Canadian consumer. We've also worked very hard on designing a building which will not become obsolete.

The situation we've worked towards is a cost-efficient renewable energy idea backed up with automatic capabilities so the home owner need not interfere with the operation of the building. To general contract that type of building, you take the differences that are required in terms of extra insulation, air tightness, and passive solar and divide those differences across the normal contracted trades so each group has a little piece of work to do. When it's finally complete, the entire unit is tied together as an efficient building. We've had fairly good success at that.

In order to monitor what goes on in our community — and Saskatoon's a reasonably small community and we're an extremely specialized builder in that community — we've been undertaking market studies. In 1979, we did a study that showed that 12 percent of the home-buying public was moderately interested in conservation methods. That was reflected of course in our sales figures. The next year, in 1980, it was about 23 percent and, last year, it was 45 percent. In last year's survey as well it showed that about 80 percent of the consumers felt an energy efficient home would have a much higher resale value in the future and this turns into the points that Hugh was making, that the consumer is slowly becoming aware of the fact that things are going to cost more and they want to be able to protect themselves and, in fact, look at a resale situation in the future.

There's been a metamorphosis in the building community in Saskatoon as well and I think it's something that's going to be spreading across Canada. In 1981, there was a demonstration project in Saskatoon where they took 13 local housing builders and they built 14 buildings. Each one of those buildings went through last year with less than $100 in heating costs. What's happened, of course, is that every builder in the city of Saskatoon can now compete with me on the open market offering an energy efficient home. That's a tremendous change for us. Before we were somewhat ridiculed for sticking our necks out when they really didn't belong. Now we're having major companies follow us, including the largest home builder in Saskatoon who prides himself on the fact that he will not build a house without conservation components in the building.

The market swing has been fairly dramatic. As you can see, it's been doubling on a yearly basis and I see the Lalonde demonstration project plus forums like the one that we're sharing as catalysts in the development of that. It educates the builder to produce a good energy building: it educates the consumer to take advantage of that particular type of structure and the market will definitely change.

Our buildings have an essentially conservative interior design format. We're shooting to a more mass market approach. We pride ourselves on designing very small homes with a great deal of usable space, gearing towards either the smaller family approach, or the material efficient approach. We're looking very hard at designing buildings and we've built prototypes of buildings that have come in at slightly greater than half the conventional cost approach, with maximum energy efficiency and passive solar systems; a fair amount of use of energy efficient light fixtures, a few greenhouses.

The aspect of designing an energy efficient home is the aspect of balancing the losses to the gains, and when you deal with the country as wide and diverse, both in economic strata as environmental differences, as Canada it's very good for you to tplan your building for the region in which your building stands. It's one way to balance the best buy principle, which is the marketability of your home to the consumer. It's also another way to best maximize the gains which can be earned in terms of energy efficiency.

The challenge, as I see it, is to develop the best, most affordable housing design for the working Canadian family that will not require any major retro-fit at any time. The home as well will protect the owner against higher energy costs or probable obsolesence.

Many of the components in this conference will cover the retrofit situation which has been left with us. I believe that that retrofit situation exists because of poor energy planning rather than a circumstance of consumption of the normal. I believe that it's possible to establish leadership in any given region within this area, and as each of us who works in the marketing field knows, when you establish yourself with the consumer as the number one supplier of a given product, the market swings to that product and you brace yourself for tremendous growth. That opportunity exists now for each region in Canada. The basic idea of the industry, especially in an energy consuming type of home, is that you design your buildings so that they fit the normal construction approach so that the neighbourhood isn't shocked by a bizarre piece of architecture that sits down in the neighbour. You want to be able to market your structures in a fairly forthright way. It's extremely fundamental to make the changes quickly, but make the changes so the consumer is unaware of them. The fact that you're producing heat bills of $7 — $8 a month is proof in itself — those heat bills spread terrific rumours — those terrific rumours sell your housing. That's the mandate by which we've been able to get our company to grow.

It's been a turbulent past. We're looking forward to an even more turbulent future. There's a task that's just been touched on, primarily in Saskatoon, which has come up with housing which is extremely efficient — that task has been worked on by a few individuals; the Research Council, the Engineering Department, a few companies like ourselves, and the gains have been phenomenal. By the time the people in this room or the people in the forum or the rest of the building industry take on this challenge, the developments in conservation housing, the innovations in assembly techniques, and the innovations, in fact, in living style or quality of life inside the home both energy efficiency and cost efficiency, will undergo what I consider great changes.

We've all been caught, I think, by something that's always been taken as an ancient Chinese curse — "May you live in interesting times" — and I think we're in interesting times.

QUESTIONS & ANSWERS

QUESTION: (Wilf Stane, Saskatchewan Housing Corporation) I'm very interested in listening to Mr. Heron speak about the heat pumps, and I have a few questions regarding the heat pumps. Coming from Saskatchewan, maybe the first one would be, is there a minimum average temperature at which a heat pump does not function economically?

HUGH HERON: I understand it's -10

WILF STANE: -10 Celsius?

MR. HERON: Yes.

WILF STANE: So, it's virtually useless for Saskatchewan?

MR. HERON: Not really. Because there's a lot of advantages to a heat pump. In other words, you've got your air conditioning and I'm sure you could use it. I don't know Saskatchewan at all, but there are some things you can do. I'm getting some little laughs from the side here — it must get pretty cold in Saskatchewan.

WILF STANE: Virtually from November to March, it would be useless.

MR. HERON: Okay.

WILF STANE: The other one is, is there a minimum size of home at which it does not function economically, at which it's not economical to install?

MR. HERON: All our studies are based on our homes in the Hethwood which range from 1,735 to 2,400 square feet, and that was the feedback we got. We didn't do any research as to was there a minimum sized home.

WILF STANE: The last, finally — what would be the economical payback in simple terms?

MR. HERON: In simple terms? We think we can pay off the heat pump in 3 years, and that's discounting that you would get your air conditioning for nothing.

QUESTION: It's directed at Hugh Heron. Whether or not the builders of homes, the major corporations, are doing the same as General Motors and Chrysler did 5 years ago. They are building dinosaurs that the public will not want in two or three years. You talk of savings of $375, but yet you have a colleague at the table who is building a house that he can heat for less than $100, and your heating and air conditioning bills are still well in excess of $1,000. When will you as builders be building homes for the market and spending your marketing dollars on selling the consumer the hidden features such as integral vapour barriers, increased insulation, waste heat exchangers, such as are on waste water systems, when will you spend your marketing dollars there to really provide the Canadian public an energy efficient house they can heat for $100?

HUGH HERON: I think, in my speech, I was talking about the problems we have as an industry, and where we all have to get together and talk to one another. When we do our research and find whether or not we can sell smaller houses, then we'll do it. But you know you touched on something there when you talked about vapour barriers and so forth. It's rather simple to say that all we have to do is to spend very little money, put a vapour barrier across, make sure that it's tight and there's an airtightness and put an air exchanger in there. I quote one of our people in the Toronto area, Bill McClintoch, who's probably doing an awful lot for research and for energy efficiency in this city and this province. Bill was quoted about two weeks ago when he did his energy efficient home: he said it was impossible to build the home that he had done in a subdivision of any size. And what he was talking about there was the lack of manpower we have as an industry. It's what I said earlier about the problems we have. We have to sit down and talk about them. In this marketplace, even today, when there hasn't been a sale, or virtually no sales, in the marketplace in the last six months, we're still finding that we don't have enough skilled people to build the houses that we sold during the boom. It's very, very difficult to get any type of tradespeople in the Toronto market to build houses. The other problem is I don't know if this public in Toronto really wants smaller housing, it's a problem.

QUESTION: I think you can even build an energy efficient 2,000 square foot house. I live in a 2,000 square foot house myself, and I don't want to live in a small house, but that house can be heated right now (this is an old house that's over 130 years old) with energy efficient methods for less than $600 a year.

MR. HERON: Well, there's two ways of coming at this problem: there's airtightness you're alluding to and then there's a mechanical side of it. We have decided that we are going for the mechanical side because there is a definite problem with obtaining the airtightness in this marketplace at the moment with the tradespeople we have available today.

QUESTION: I would direct this question to Keith Funk and to anyone else who would make a comment. I would like to hear your opinions and comment on these heat storage trays that are now coming on to the market versus, say, the Tremblay wall or that type of massive collector.

KEITH FUNK: I've a fair amount of familiarity with Eutectic (?) salt trays. There's a manufacturer in Saskatchewan that produces a Eutectic salt tray. They sell it for $4 a tray for equivalent storage and an easier system, which is somewhat less efficient. I grant you that either a water wall system with a selective surface on the exterior or a thermal storage system which simply uses masonry still beats it as far as the price goes. However, I do feel that the eventuality of being able to have a very highly efficient thermal storage like the Eutectic salt storage in a cost efficient active solar system will come. The method by which the units are developed in Saskatchewan is just simply Eutectic salt in a small PBC container that's stuffed with peat moss to keep it from de-stratifying. They are very, very efficient, and they have a twenty year guarantee. The cost at this point is a little high. Once that's solved, and it passes the best buy principle, you can buy them in my houses.

QUESTION: (John Terrasuk, University of Western Ontario, Mechanical Engineering Department) About 3 years ago, I was in Sweden, and I want to address this question, as a result of my experience, there, to the first and last speakers because they showed the importance of the vapour barrier, and the film they were using was a polyethylene one. In my discussions with some of the people in the building trade in Sweden, they had monitored, ten years ago, a series of homes which were carefully designed, constructed. Since that time there was an earthquake and all of these home were levelled. The first thing they did is to send a group of engineers on to the site and found that the vapour barrier was non-existent. It had apparently deteriorated completely so I'm just wondering whether any studies are being carried out to see how good your vapour barriers are.

GUS HANDEGARD: Polyethylene, that you mentioned, was looked at, 30 years ago, not from the same point of view, but from the standpoint of its durability as a below slab moisture barrier. My recollection is the accelerated test they did which involved, I think, salts, but mostly bacteria showed that it was reasonably durable. But I think the problem that probably explains your situation (I could be facetious and say it may not have been here in the first place) the radiation would probably destroy it in areas different from other areas. The only thing I know that is really hard on the stuff is ultraviolet radiation, as you know, and I think that if you're talking about a vapour barrier, it may be that they will decrease over the years. I think in many instances the airtightness of a house is due to things other than the vapour barrier. The vapour barrier is used for a different purpose. You can achieve it with a point film for that matter, so I can't explain the situation, but I'd be interested in the report. If there were no pieces of it left, it sounds as if to me that it must have been very poorly specified in the first place.

MR. TERRASUK: There was evidence of it, but there were only shreds of it. Apparently all of it had pretty well disintegrated, and they're not sure why. I think the construction was essentially the same as the construction we have in Canada.

MR. FUNK: The only comment that I may be able to make under that particular type of circumstance, if it wasn't interfered with by UV radiation, it could have simply aged and become brittle and broken apart when the earthquake dropped the building. Until then, it may have been functioning as a vapour barrier — were any pressure tests or anything done previous to the calamity?

MR. TERRASUK: No.

MR. FUNK: I guess we really don't have any long-range understanding of the longevity of the air vapour barrier. The assumption is a plastic sheet lasts forever. You're holding a plastic binder — look at it in the year 2001 and remember this conference. If the binder is still there, don't worry about the vapour barrier.

10 The Building Envelope

John Hix:

Architect and formerly a city planner. His Toronto-based company emphasizes energy efficiency in residential and commercial design.

My experience over the last 10 years, working on an energy efficient design for housing, has led me to analyse that there are really two equally valid approaches to new designs in housing.

The first really valid approach, if you're interested in reducing the demand for energy in housing, is the super-insulated building, very compact in design, tight infiltration barriers on the house, small windows — relatively small windows — fitted with shutters, and air-heat reclaim machinery. And as the boys out in Saskatchewan say, that's called the "light and tight."

The second approach, which I believe is as valid, has all the specifications of the first, but it has larger south-facing windows. Therefore, it requires thermal solar storage capabilities. And this is known by Harold Orr as "glass and mass." So we have light and tight, and glass and mass, which have emerged over a period of time as being saleable and marketable.

The conventional suburban house as we know it today, from the '50s, has a fairly large window area, and between 10 and 15 percent of the floor area is in glass, so that people who have purchased homes over the last few years are used to having good lighting conditions, and visual relationship to the exterior. ex Therefore, the second type, glass and mass, provides for these better lighting conditions over some of the energy-efficient enclosures, which are know as the light and tight.

The so-called passive-solar design, therefore, is an ascetic decision, a way of making an energy efficient building, but also using glass in similar ratios as we're used to in marketing a home.

The other qualities that you get from such an approach, of course, are sun rooms for plant growth, and a lot of sun in buildings for health and general well-being.

Some of the light and tight homes can often be considered to be light and dark, as it were. In other words, light construction, but with such small windows that they become rather unpleasant to live in.

Our firm designs both types — light and tight, glass and mass — and we choose often to do the light and tight construction if the orientation for sun is difficult and particularly in very urban situations where orientation to sun is not possible.

Also, poor soil conditions will not allow the introduction of a great deal of mass in the building, therefore requiring light construction.

Recently, we are just finishing the construction drawings for three dormatories up in Quitico Centre, which is near Atikokan, and we've taken the light and tight approach. The dormatories are 8,000 square feet, and 30 units per dormatory — 30 bedroom units with a bathroom associated with the bedroom.

We have introduced very heavy insulation in the roof, R68, which, according to our calculations, has a 12-year payback, which wouldn't be so good for a builder's home, but for this particular project is acceptable to the client. The floors are R56 and the walls are R28. There are insulating shutters on the windows so that the people who leave the room to go to classes will in fact shut shutters over windows during the day, when the rooms are not being used.

There's a tight vapour barrier in construction detailing and heat reclaim. A commercial heat reclaim system in the building provides 1/3 of an air change per hour, and a nighttime thermostat setback. The heat reclaim system appears to have about a three-year payback, and the night thermostat temperature setback approximately a five-year payback.

The calculated cost for heating the building during the rather long heating season in Atikokan is around $1000 for heating, which means that it requires approximately five kilowatt hours per square foot of the 8,000-square-foot building.

The cost of electricity up there is 2.5 cents per kilowatt hour because they traditionally have used so much electricity in heating their buildings. And that's an incredibly low price.

For smaller buildings, our firm opts, as a design consultant firm, for the glass and mass approach. And usually this is with direct gain and sun spaces, because those are the two passive-solar design approaches that we can sell easily to clients from an ascetic point of view.

The glass and mass relationship is so important to maintain even temperatures in the home.

One type is of light-weight construction. It has an air-to-water heat pump so that it is in fact a hybrid passive solar building.

The excess heat in the space is stripped off by the air to water heat pump and stored in a 1000-gallon tank in the basement. It's using a heat pump internally, within the dwelling, rather than an air-to-air heat pump, so the heat pump can be used at higher efficiency in relationship to solar gain through the window.

The glass is insulated at night with an R10 roll down curtain.

Another type is an underground home which emerges out of the landscape and has a large glass area to the south, which is again fitted with insulated curtains.

The home is quite bright, and again we have slab construction for storage of excess solar gain, and all the walls inside the building are with concrete block construction plastered; so again the glass-mass relationship. The building had just over $150 in heating bills two years ago when it was monitored.

Another building has a large sun space on the south side and has a fan on a differential thermostat, which fans the excess solar gain whenever the temperature is 18 degrees above the storage temperature.

It fans it into a rock bin in the lower level and then recycles it back to the sun space at the front of the building — another less expensive hybrid passive solar design.

In yet another building, the introduction of mass inside the space with large masonery areas and double dry wall. Also, the fan unit of the furnace is used to fan the excess warmth in the winter down into the basement area, so the basement becomes storage. These become fairly simple devices that work quite well to lower the heating bill. So again the glass and mass relationship.

Another passive solar house uses again the floor and the fireplace area for storage, but I got a little overexuberant and took the carpet all the way to the wall. We had to, of course, cut the carpet back so that we had concrete exposed within the space.

These are the things that you come up against when you're doing something different. People are used to putting carpet to the edges of the rooms.

These houses are fairly easy to market in the sense that they have good ascetic qualities and good relationship to sun.

More recently, I've been attracted for a long time to the concept of using earth or the basement below a home as the mass.

Introduction of mass into buildings that are in a timber building culture — the way that we construct our homes — is often very expensive. The introduction of extra dry wall, the introduction of concrete or concrete blocks within the building as partitions can often be very expensive, so I've been quite attracted to using basement areas and earth areas under the house.

If you place a building over the earth and use insulation around the periphery of a basement or foundation wall, the earth maintains a stable temperature of between 40 and 50 degrees in this climate, around Toronto.

Our experience has been that the lowest temperature in our double-envelope house that we've monitored — the alpha house — was 44 degrees. This is relatively warm when comparing to something like -20 to -30 degrees outside.

The concept is that the excess solar heat which you experience on a winter's day is on a differential thermostat in relationship to a fan. When the temperature in the sun room is 18 degrees higher than the temperature under the home, then the fan switches on. The relative inefficiency of a large area under the house, when just warm air is blown across it, becomes efficient because of the actual size of the area — a full basement, for instance.

The concept is that we only use a fan in the collecting mode, and the fan is either placed in the attic or down on the back wall. In a sense, it is a duct system taking the warm air down to the basement or down to the crawl space where it is collected by the mass below.

You've got to have the foundation area anyway, so that mass is relatively inexpensive.

During the night, the warmth below the house simply mixes and tempers the sun space in the double back wall. Essentially, what we have is a traditional basement or crawl space below the house, an additional sun room on the south of the building, and a fairly traditional attic space in the sense that you have an outer roof and a ceiling. The addition, of course, is the double back wall to take the air down the back wall.

In the summer, the whole system is short circuited by opening two vents in the attic. And because you have an attic space, any warm air from the sun room flows up into that attic space and eventually out of the shell.

We've experienced a very good conditions in the sun room space even with the sliding glass doors closed — not going over 90 degrees in the space itself in the summer time. Most of the time it is much cooler because it causes a draft up and out, so the sun space becomes also a buffer to the inner house.

One of the objections of direct-gain, passive-solar houses is that you often, in the spring and fall, can get some unpleasant conditions of overheating and constantly you have to be opening windows and closing windows and modulating your space, whereas, with this buffer, all that kind of change happens in the sun space.

We also use the sun space because it's so pleasant as a sleeping place, except for a couple of months out of the year. In November and December we find that it is not usable for that purpose.

The relationship of the inner house and the sun space I think is quite pleasant, particularly in extending the summer condition. The house will never freeze with no heating on whatsoever, and in fact it keeps the tropical plants alive and never drops down below 45 degrees inside the house. In other words, we could go away for two months, and leave the house, and the lowest temperature would be 45 degrees, which is a boon if you are concerned about pipe freeze-up.

For 100 percent occupancy during the heating season, $111 worth of propane and wood was used for the whole season. If we had been on natural gas our heating bill would have been $63, but we had to use the more expensive propane, being isolated in the country. Had we been on electricity, the heating bill would have been $90.

I'd just like to say that passive solar is a way of having energy efficiency, but with lass, and a good relationship to the outside. And if energy were the only concern, I think that insulated boxes with small windows and shutters, with mechanical ventilation, would certainly be the way to go.

But light and sun are very important for mental and physical well being. So direct-gain, passive-solar and sun spaces, I believe, will in the future be very popular and easy to sell as a formula for a low-energy house with a good relationship to the outside.

Appropriate climate design — which is all we're talking about — is not only cost effective and fundamental, but it will generate new house forms in the future.

I think that they will enhance future quality of lifestyle. And I believe that the next stage of passive solar buildings will in fact be able to show that kind of enhancement of lifestyle.

David Eyre:

Principal Research Scientist of the Saskatchewan Research Council. He is educated in London England and was formerly senior scientific officer for the United Kingdom Atomic Energy Authority.

With energy conservation measures being applied indiscriminately and with wild abandon around various parts of the house, we have to be very careful about the sort of interactions and ramifications that we may be setting up in the structure.

Although I shall be talking about the building envelope primarily, you'll forgive me if I start off with a summary of the evolution of the energy-efficient wall as it has taken place in Saskatchewan.

The Saskatchewan conservation house, back in 1978, pioneered a new solar construction — the double frame wall. Since then, the whole thing has evolved, and one of the latest examples of this evolution consists of a single 2x4 stud frame on the inside, and a 2x3 sub frame on the outside, giving a total thickness of about one foot and an R value of typically around R40.

The thing to note about this is that the vapour barrier in this evolved design, is routed around the outside of the interior frame. What this does, it places it out of harms way from the various tradespeople who like to come in and destroy it — the dry waller and the electrician and the plumber, particularly.

Therefore, one could achieve a very high level of air tightness, and ensure that air tightness with this kind of design. The design is having a number of structural problems which I won't go into. The point I want to make is that, with this sort of high level of efficiency, it only makes sense to use it in a house if you're going to adopt the same high levels of efficiency in all the other components. And what this amounts to is a very expensive house. You're looking at $7000 incremental costs on, typically, a 1200-square-foot house to bring it up to these high levels.

At the present time, this is not very desirable. The average homeowner is already being plagued by rising capital costs and high mortgage rates, and very few people can now afford to be a first-time homeowner. Still less can afford this $7000 increment on the thing.

Therefore, if energy conservation housing were to rely totally on this sort of design, and it's a rather fuzzy design, Canada will not achieve energy self-sufficiency by the year 2005, because residential energy conservation will not be able to play its part, for the simple reason, that most people cannot afford it.

We have to start considering ways of achieving high levels of energy efficiency in an affordable way.

I now want to talk about the air-tight envelope of a house. The average house with an average vapour barrier has a very high level of infiltration. If you look around the shell of an average house, you'll find various openings around windows, tops of partition walls, electrical outlets, where the plumbing goes through the vapour barrier, and so on.

If you add these all together, then what you will find is that the total area amounts to something like the size of half a door. Now a lot of purists argue that it's not really half a door, it's a quarter of a door. This is a very academic point. The point I'm trying to get across is it's a bloody big hole.

Through that hole, in an average situation, you can get typically as much as three quarters of the air changed per hour and maybe one air change per hour. This means the whole volume of the house — the air — is changed every hour. In an average day, this means it's something like a third of a million cubic feet of air passes through the house.

This is far more than you need for good air control and humidity and so on, and it's a major source of heat loss. You have something of the order of seven tons of air coming into the house cold, you pay to heat it up, and then you throw it out through another set of openings. So this is a major source of heat loss. It accounts for sometimes up to 30 percent of the total house heat loss.

On the conservation house, the Saskatchewan conservation house, we pioneered a new technique called the air vapour barrier. The idea was to build a perfectly air-tight envelope to reduce this heat loss. How do you maintain the continuity of vapour barrier across the top of that partition wall? The answer is you put a preparatory strip between the two top plates of the wall, and then you caulk along the top of this strip.

With this technique, we're achieving very high levels of air tightness — typically three percent of an air change per hour as opposed to 50 to 100 percent of an air change per hour in a standard house.

Unfortunately, with this kind of house, you inevitably have to do something about air quality because you've got humidity, you've got odour buildup, you've got pollutant buildup, you've got radon, you've got a housewife with a whole arsenal of chemicals under the kitchen sink — very lethal things. You've got all sorts of nasty chemicals building up in the house.

Therefore, you have to give it an air management system, which means quite simply that you have to bring fresh air into the house and throw stale air out. You do it under a very controlled situation.

A lot of people assume that a heat exchanger is an essential part of this — it is not. It is an optional extra which helps to recover some of the heat that one would normally lose by this controlled ventilation process.

We are now finding out that the air vapour barrier is not an energy saver. We'll take a standard house and we'll look at the situation as it was in 1978.

We thought, in 1978, that the standard house had an air-change rate of about one air change per hour. We thought that in the energy-efficient house, we could build it perfectly air tight, and then give it an air change rate of about .16 air changes per hour. By reducing that air-change rate, we reduce the heat loss by a factor of six.

From latest tests, which are a little bit questionable, we're learning that the average house has an air-change rate of about 0.5 air changes per hour. Also, the environmentalists and the air quality freaks are telling us that in order to maintain good air quality in the house, we have to give it .5 air changes per hour. This again is questionable. We don't know. We don't know what these pollutants are, we don't know how fast they build up, we don't know what kind of air movement we need through the house.

What we are saying, is if you take a standard house with just .5 an air change per hour, you add about $2000 to $2500 worth of air-tight construction to it — this includes windows and everything — to make it totally air tight, and then you put a bloody great hole in that beautiful construction to bring it back down to 0.5 air changes per hour.

So you've gone and you've paid $2000, really, to give you the same thing you started off with. This doesn't make a great deal of sense. By 1990, maybe, we will see that an energy-efficient house needs only .3 air changes per hour to give us satisfactory air quality. If so, then it will give us marginal energy saving.

The main value of the air vapour barrier, and the one that I would urge you to think of it as, is as a protection. It stops moisture getting into the structure. In the next few years, as housing starts evolving, you should be trying all sorts of techniques weird, wonderful, untested, and we have a great potential for building all sorts of problems into our houses.

The air vapour barrier, I would urge you, is one of the most advisable things we can adopt in a house, because it's a fail-safe protection against the worst effects that one can build into a house. It does protect you, and it's very nice to know that it's there doing its job.

Brian Marshall:

He was one of the principals responsible for Ecology House in Toronto, a demonstration project in Toronto highlighting the applications of energy saving techniques in retrofitting.

To be a little bit more bright on the air quality side of things, even if you do end up with an air change rate of .5 an hour, if you've got the mechanical heat exchanger in there, you still are extracting that much more heat out of the exhausted air. So in terms of the energy savings, I'm not sure if your 8 percent, which I think you'd end up with, wouldn't be a little bit higher. Either way, developments need to be made in that field, and substantial energy savings can accrue from the effective use of energy conservation practices in the new housing stock.

The reality of the situation is that by 2005, 80 percent of the housing stock will already exist. So, we're only building a certain number of houses from now until the turn of the century.

If we indeed are trying to do something serious in terms of the residential market, the focus has to be on the retrofit solution, or what are we going to do with the existing housing stocks.

If a house that's built to today's standard in 1978 can be deemed a thermal slum, I can't think of the appropriate answer for the sort of houses that are all over Toronto, built in 1900, leak like sieves, with no insulation values whatsoever. Actually, they're just going to become white elephants over a period of time.

What we've done on behalf of Pollution Probe Foundation is to take a 90-year-old Toronto house — just about as bad an example as you could find, a building that hadn't been heated for three years, leaked like a sieve, the doors literally had half-inch gaps underneath them. And we took that with a series of architects, engineers, lay people, and designed what we thought would be applicable to the average homeowner in Toronto.

Some people may quibble with our insulation value in the attic, and things like that. But we tried to make decisions on a framework which had a relatively sound economic payback which was relatively ascetically pleasing, which took advantage of some of the aspects of the specific site.

We got into a little bit of the mass and glass, and a lot of the light and tight construction within the building itself. Simply by throwing insulation into the attic, which represents somewhere around 10 percent of the heat loss, we're not going to get a great energy saving.

It actually is that the shell of the building, or the envelope of the building, which has to be upgraded in order to allow those houses to be liveable over a period of time.

We ended up starting out with a house built in 1890, a very large Toronto house typical of buildings in the Annex area of the city; atypical in terms of its nice southern exposure.

I think the savings that we have seen in Ecology House are relevant to a lot of the other houses in the area, but one might go about it in a different way.

For instance, if one didn't have a large southern exposure, the insulation levels which you could attain in the walls would probably end up being somewhat equivalent.

In today's fuel bill, a house which would have been consuming somewhere in the order of $3500 to $4000 in the heating season '81-82, we will have reduced that to somewhere between $400 and $550.

In writing our book, we actually spent about 95 pages on the interior of a house, and the various steps that one would need to go through, and about 40 pages on the exterior job. Without a doubt, the best gains can be had by reskinning a building from the exterior. You can actually wrap a whole house with a piece of plastic without any gaps whatsoever. You don't have to worry about cupboards, you don't have to worry about toilets, you don't have to worry about partition walls within the building itself. So you don't have any of those inconveniences by doing a job from the outside.

However, especially in Toronto where you've got a lot of solid brick buildings, not many people are all that willing to cover or to resheath those buildings. So the job can be done from the inside using the concepts of curtain wall construction, actually framing up new walls, lifting them into place, banging them down into the joists above and below, and then the insulation would be put in there and the new vapour barrier installed.

One of the problems that can occur in older houses, by tightening up aspects of the house at the expense of others, is a siphoning effect of the humidity and the water vapour within the building itself, and a concentration of that moisture moving out through the cavities between the floor joists. So, wherever possible, one should be looking at trying to make that vapour barrier continuous throughout the building so that you don't have that excess water getting into the brickwork in the cavities — freezing, thawing and leaving new potential structural damage.

QUESTIONS & ANSWERS

QUESTION: A few years ago we were shown some new technologies that were being developed in the U.S., starting from the premise that you must retain the integrity of the exterior wall, the insulation of the interior wall. There was a builder who built a series of homes which were monitored and studied for two or three years for performance. There was a great deal of talk about some of the small details because he did nothing except change some of the standard detail that's normally accepted, and just used traditional materials.

That was four or five years ago, and yet I have seen nothing in this country to show that any of that's been adapted. Some of the things that he was suggesting, for instance, were change from the corner structure of the two stud walls to eliminate headers over windows and doors and to use plywood plates so that you were retaining the integrity of the full six inches of the exterior envelope, putting V joints in the bottom of all the vertical members of the stud wall, and run your wiring along there and so on. These are common-sense things, and yet they've never been adopted.

What do you see of the type of things we're suggesting, which is kind of intricate work on a job site?

MR. HIX: Recent survey suggested 5000 energy-efficient or low-energy houses across the country. I think the breakeven point there was $200. That suggests that those techniques, or similar techniques, are being employed in larger numbers.

In terms of their relevance to the commercial sector, I see it as being a chicken-and-egg situation in which builders for some reason or another refuse to go out and put the things on the market, and the market can't respond because there's nothing out there to respond to. So there's a quantum leap from what's happening now and where this infant industry sits in terms of a relatively custom built housing market to getting it out onto the broader market.

MR. EYRE: I suspect that what you're referring to is the Arkansas House. This has been copied in Canada, and the nearest approach to that is the Conserver 1, which is in Prince Edward Island, and this is a very good little house.

I think I could answer the question for the west. For the east, I think you've got this peculiar problem in that 2x6s are not so readily available here as they are in the west. And I understand that moves are underfoot to develop a sort of fabricated I beam using, say, two 2x4 rails with a plywood web between them. This is certainly taking off in Saskatchewan now, and I think we're going to see a lot of development of this sort which I think will not only assist the builder to implement energy efficiency, but might also reduce the costs of these new structures.

I don't specifically know the detail you're talking about, but in Saskatchewan, the designers are very conscious of corner heat loss. We don't think one needs three 2x4 studs on the corner, for instance, particularly on the double-wall construction. And there are lots of areas where one could trim down.

But the over-riding principle must be to avoid building structural problems into the house. My personal view is that one should play safe rather than go overboard for energy efficiency. You've got to keep that structural integrity.

QUESTION: What kind of structural problems did you encounter in that first house you mentioned?

Also, are any of the panel members aware of any research on the situation that occurs in vacation homes or air conditioned homes that have the situation of a colder temperature for a large part of the year, inside and outside, and the possibilities of condensation on the wrong side of the vapour barrier.

Finally, to deal with the humidity question alone, as opposed to any other pollution problem in the interior air space, what number of air changes per hour is your view at the moment? Are we talking .5 or .3 or is it some other number.

MR. EYRE: On the situation regarding the double-frame wall structural problems, some of the designs that are being developed are being designed for cheapness and the exterior wall, which is a non-load-bearing wall, is just there to thicken up the wall and to attach the siding. These are not being tied in very well to the main load-bearing wall.

We are observing, or we have some very strong but unauthenticated rumors that the siding is starting to slip on these walls — the exterior sort of curtain wall is starting to slip. Builders don't go around shouting this sort of thing from the rooftops. They keep very quiet about these things. It's very difficult to authenticate them.

All we have as an indication is that a lot of builders who are doing this have suddenly started to put cross bracing between the inner and the upper frames. This, of course, adds to the problem.

The other thing that we have observed on a double-frame construction that we ourselves supervised was an apparent outward bowing of the outer wall. And we detected this because the wall was being improperly installed, and it was pulling the window away from the interior wall finish, and a gap of 1/4-inch opened up.

What we assume happened there is the same sort of thing that happens in truss lift, whereby you've got two different framing members operating at different temperatures. They have different moisture levels in them and, therefore, they shrink and expand differentially.

This is what happens in a seaming truss where you have the truss lift. We think it also may be happening in this double frame construction, where one frame is running a lot warmer than the other.

About condensation on the wrong side of the vapour barrier, I've never experienced it myself. Intuitively, I would think that in summer one never gets to a cold enough situation where condensation might be a big issue, certainly not in Saskatchewan anyway.

The air change per hour I would recommend is about .3 at the moment. I think it's a good, safe figure. I'd like to give a bit of rebuttal here about the air heat exchanger. Granted, if you've got a controlled air-management system in an air-tight house, you can't put an air heat exchanger on it and recover some of the heat. But when you look at the actual saving it gives you, and bear in mind that these things cost $800 to $1200 installed, it's certainly not a good payback situation, and it's not one that I would do myself.

MR. HIX: Experience that we have had in our homes, the designs that we would recommend to the people who live in those homes, is that anytime they are creating any moisture — in the shower, or cooking — they get rid of it immediately with the fan, and at the end of the year, by doing that, they still had a very low heating bill.

When you have a very tight vapour barrier in your home, you have a choice to improve the air quality. But if you have a leaking home, you don't have any choice at all — it's constantly doing it for you. Once you have a tight house you have the option of a large heat loss through fan vents, or even back venting, which can happen. Sometimes that's a refreshing situation.

QUESTION: In the "retrofit-ready" house, what would you calculate the payback to be currently for the extra $3000 to $3500 if you're considering that it costs that much more than a sort of conventionally constructed house.

I also have a question about putting the vapour barrier on the outside of the house, particularly when you use a rough rule of using twice as much insulation on the one side as the other to prevent moisture condensation. How do you put double insulation on the outside when you do that, assuming there is insulation on the inside already. Is the payback worth it?

MR. EYRE: I would like to be able to answer you on payback, but I don't deal in payback. I think it's a very misleading sort of technique. I can give you some figures that I think are far more valuable. If you were to buy one of these retrofit-ready houses with the maximum loan rates that are now available, you will be paying $100 to $150 more on your first payment, on your deposit, than on a standard house.

Your monthly payments and your space heating bill would be about par with the standard house. That is, you wouldn't see much shift — possibly $1 or $2 per month — one way or the other. It's a very close situation there.

But in 20 years, who knows what the situation might be. This is why I don't like to give payback because it makes assumptions about energy costs, and these traditionally are always wrong.

MR. MARSHALL: The payback issue is an interesting one in that there's a value judgement. I think we all make a value judgment when we decide whether to buy a colour TV or not, and we certainly don't ask ourselves what's the payback on that colour TV.

There are a lot of people who want to reduce their energy consumption and don't have to have things in whoever's nebulous figures are provided.

In dealing with the question about the exterior retrofit, you have to find out what exists in the walls at that point. You want 2/3 of your insulation value on the outside of the vapour barrier, so if you're reskinning a building — take a Toronto house which is R4 — all you have to do is add R8 to the outside — that would be a solid brick house.

If you're looking at a house which would be more applicable to a serious retrofit, which would be maybe an R8, then you'd want to put at least R16 on the outside of the house.

If you've got an R12 house, you're looking at either being gutsy and going with R20, or being safe and going with an R28, which simply means that you expand that ledger plate detail at the bottom of the wall.

QUESTION: Can you comment on the co-operation or flexibility of the city building department in your non standard approaches to Ecology House, and particularly with the lack of a six-inch air space against the roof deck.

MR. MARSHALL: To be honest, I don't know. I've had chats with the head of the Ontario Building Code on that, and he understands the issue with regards to providing the ventilation space behind the insulation, but can't assume that everybody is going to be as conscientious about installing the vapour barrier as we may have been, or as other people doing energy efficient work might be.

I'm not sure if I wouldn't agree with six inches on conventional construction practices, with all the leaks and holes and cracks in the vapour barrier on those sections.

Otherwise, with regard to the building department, I don't think they're very interested. They don't really see it as being a coming issue in Toronto. Most of the problems are get aroundable. On adding exterior sheathing to a building, I think the committee of adjustment has set a precedent that if you're not creating obvious problems — for instance, not enabling your next door neighbour with a Lincoln Continental to get through the shared driveway — that they'll let that go by.

Section D

ENERGY SAVING

11 Weatherizing And Caulking

David Peters:
Housing Renovation & Energy Conservation Unit, Ministry of Municipal Affairs & Housing, Ontario.

My name is David Peters. I'm the co-ordinator of a project which we're calling the "Weatherize Project" of the Ministry of Municipal Affairs and Housing. We're doing this project in four cities to measure the airtightness in existing housing types in Ontario and to determine what the appropriate procedures are to produce that airtightness in these various housing types. As a bit of a backgrounder, I think most of you know, over the last five or six years, with fairly intense investigations into the housing in Ontario, out West and in Princeton, New Jersey, a group of people have determined, beyond a shadow of a doubt, that one of the major losses of heat in a house is really the air pouring in and out of a house. You heat up the air in the house, and then the air blows away through the nooks and crannies. A lot of the heat in your house is lost that way.

Unfortunately, however, most of the research that's been done has been done on test houses and specific kinds of housing.

A lot of the work has also been done on new houses. What has only begun to be done in these other jurisdictions and in Ontario is to take specific house types sorted out by the kind of fuel system in the house, the structure of the house, the age of the house — the house as it is. We try to determine what specific areas in the house should be tightened. What results are possible from tightening older houses of various kinds, and so on.

We're going to do sixty houses in four different areas, each with a slightly different climate and each individual house representing a certain type.

Some of you have probably seen our literature. Some of it is based on some original work which was done in Saskatchewan and some of it is new. The gist of what we're proposing is that people should seal their houses first, then look at their insulation, and, finally, look at their heating system. There are two major reasons: to prevent condensation, and to reduce infiltration.

We estimate right now that the savings the typical homeowner can make with upwards of $100 worth of materials, is about 10 to 15 percent on the heating bill, and that represents about 30 percent, maybe more in some cases, of the actual air leakage in the house. The other reason we're really urging it is because it is a first step in a householder's energy conservation program.

We're not talking windows and doors alone. There are an enormous number of other areas where air leakage takes place; bypasses that go up into the attic, electrical outlets, the sill plate of the house where the house sits on the foundation, and areas of that kind.

I should mention the precedures we're using, and the procedures that the young industry is beginning to use. They involve using a de-pressurizing fan on the front of the house which sucks the air out of the house for two reasons. First of all, it creates drafts all through the house and those drafts can be used to find the leakage points. The second reason is that the process that is used with the fan can measure the exact air leakage in the house and then can measure the reduction. A lot of young firms are offering the service to homeowners of testing their houses and preparing them for further insulation by reducing the air leakage, caulking, sealing, and weather-stripping.

A study that I did with some help from some other people who are more economically minded than I am, shows a typical 1973 house, and the fuel bill worked through as to what it will become by 1990 using this year's agreement between the federal government and Alberta. It shows the heating bill going from about $390 in 1973 to about $4,000 in 1990. Now, that's oil all the way through with no changes being done to the house.

Then you have a house that Harold Orr found somewhere out in Saskatchewan and he likes to talk about where apparently the chap was fanatically into insulation and did a major job in insulating his house. It was something like R80 in the ceiling, and R50 in the walls, but he didn't do any real work on air leakage. The insulation gets "short circuited". You can see that stopping air leakage is now a very major portion of energy conservation.

One of the reasons we've suggested in our material that you should first seal your house and then look at insulation and your heating system is if you undertake a major conservation program, first you're going to substantially reduce the need for the size of furnace that you have. I think this is a fairly important thing to draw to people's attention because, of course, the federal government has now moved into the market place with a major program of furnace conversions. A number of people are going to rush out and buy a new furnace and then, as the prices go up, they're going to start conserving energy. They may very well end up part way down the line with a furnace that's far too big for their much reduced needs. The moral of the story is if you're planning to live in your house for awhile, you should seal your leaks, conserve energy, and then buy your new furnace. The feds have taken this into consideration to a certain extent by mandating their program for seven years.

Consider a 1973 house that has been retro-fitted in a staged manner over the years. A more efficient furnace and 'CHIP' insulation has been installed and fuel use has gone down from 1050 gallons of oil to 843. The owners have also done a certain amount of weatherstripping and caulking on their own, and reduced the air leakage by about 10. Now, we believe that between now and 1990, it's going to be economic to go much further than that and put R20 in the basement of this house, which at the moment has no insulation in the basement. They can also have a weatherizing company come in such as the ones we're using in our own test houses, and reduce the air leakage by about 50 over the 1980 figures and, as well, to set up an automatic thermostat which continues the house at 70 in the daytime, but reduces it during the night. Finally, half of the windows are being shuttered at night, that is to say, some insulation blind is put on the windows — the windows originally in this house we're using for the example were double glazed. So now they've reduced the needs down to about 345 gallons.

The job cost about $4,500 we estimate using today's figures and projecting into 1985. The saving on that is about $1,320 a year in a fuel bill so it's about a 3.2 year payback. That is to say that the savings cover the capital costs within three years or thereabouts.

By 1990, saving energy is getting a little more expensive because the cheapest energy has already been saved in the house, but by this time we assume that the family that's living in this particular house has decided to do the walls; they've done either an outside or inside retro-fit of the walls to R20, and have again substantially reduced their heat loss. They've also put a vapour barrier in which allows another major reduction in the air leakage. The work that we had suggested they had done between 1980 and 1985 involved a lot of caulking and sealing and weatherstripping, plugging windows, filling in milk chutes, all that sort of thing. But if they do the walls, they then can put a major effort on a vapour barrier and install that on the walls, which is by now the major leakage area in the house.

Taking a lead from this family most of you looking at your costs will see an opportunity to put some money into your house and have a saving of over 20 to 25 percent in terms of the recovery you make in your fuel bill, and I suspect also by 1985 you get the capital cost back because I think in the real estate market people are going to be asking a lot of questions about what sort of work has been done in the house, and that's going to affect the price you can get. I don't imagine energy conservation is going to be like the situation now where you can spend $10,000 remodelling your kitchen and sell the house for an extra $20,000, but it's going to certainly get to the point where people are going to be looking at houses and thinking about what they're going to pay in terms of the energy efficiency.

The most important message again is what we're suggesting to people in the program we're going to be unfolding over the next three years: first, seal your house, then look at your insulation, and then your furnace. The government, by the way, got interested in this, largely because some people started to work out the savings that were possible at very minimal costs in this kind of work. Effectively, if all the houses could be tightened up in the next five years, the equivalent of a small oil sands plant would be built in Ontario by virtue of the oil that's being freed up. So, from the government's point of view, it's of very great interest to get this information to homeowners. One of the aspects of the program we're dealing with is to provide pamphlets we've written in hardware stores — through the test cities. Surprisingly enough, we've discovered to our pleasure, and also from the budget point of view, to our horror, that we seem to have underestimated the current demand by something like 1500 percent. We felt we'd have to hire a marketing student to go into the stores and persuade them they should take our pamphlets but stores have written us and said they won't take 200, they have to have 2,000 to supply the needs and they would even be willing to share some of the costs for those pamphlets. So we stumbled into a discovery that a lot of consumers are really sick of being told about oil sands plants and percentage reductions and fuel bill savings and are after fairly concrete, grainy information on exactly how to do things. I think that most of you are fairly familiar with the fact that from 1973 to 1980, things were a little chaotic. The C.H.I.P. grant system and the fuel crisis created a heavy demand, and it was met very quickly by the small business world, mainly the insulators, and people like that. There were no real fence posts on the terrain, the do's and don'ts were not clearly laid out. The government had not really established a policy. The consumer really didn't understand what he or she should do. What we're looking toward now is a fairly massive market. I think the response we had to our pamphlets from the hardware stores indicates the beginning of it. The figure you saw on the screen this morning was 200 billion dollars; in Ontario, those numbers translate into about 35 billion and I figure the retro-fit market is probably about 7 billion of that. That 7 billion really is Ontario's homes multiplied by the $4,500, more or less that I estimate it would be worthwhile for people to spend between now and 1985 or 1990. If things continue as they are, a lot of that money's going to be spent.

The rest of the situation, I think, is fairly straightforward. There's going to be increased regulation and a far more balanced marketplace. The certification of insulators will be expanded. There's going to be a lot more increased training and education as community colleges are moving into the field very quickly. I think the major thing in terms of efficiency will be the gradual switch to a Class A audit which means rather than phone in or punch a few buttons on a computer, you actually have someone available for $100 or so whom you can get into your house and who'll help you work out a five year plan to conserve energy in your house and who will advise you when it would be appropriate to buy a furnace and so on and so forth.

In effect, there's going to be a sorting out of the energy services market and there's going to be all sorts of services being offered by the private sector. There will be the house audit which I just described, basically an analysis for the homeowner; there'll be the house doctor who will offer more than merely an audit, but will also do the kind of work we're doing in our project which will be air tightness and ventilation packages, and furnace tune-ups, and installing some simple equipment.

The renovation world is also starting to deploy a fair amount of expertise directed at energy. It's cropping up now in things like solar greenhouses which are being half sold from the point of view of the remodelled kitchen world, and half sold from the point of view of energy conservation. I think that will increase. The insulators are going to be far more expert. Some of them will become more adept at the world of auditing. They'll start learning how to do heat loss statements and things like that and will be encouraged to do that by the increasing demands of the consumer who will understand much more what they want and by the government who will be nudging the industry in the direction they feel is going to make the most effective savings for the province and the country as a whole. The building suppliers: you'll see a lot of them starting to organize themselves for the do-it-yourself boom that everyone figures is coming. Instead of hunting around for weatherstripping and caulking in seven different departments in the same store, it'll all be grouped together in one energy corner. There'll be an enormous amount of product evaluation. Companies like Canadian Tire will be pre-vetting products and testing them and guaranteeing them, and so on.

We had quite an interesting conversation the other day among the staff trying to figure out just why the building suppliers were demanding the information we had to such a great extent. One of the ideas that came up in our conversation was that the real consultants, the real experts, the real advisors that the consumers trust are often on the hardware store floor or the building supplier store floor. In that world the feedback is very, very quick. Those salespeople generally find out what they're selling and what it works on almost immediately from consumers, and consumers over the years have developed an awful lot of trust for them and go to them quite a bit. One of the areas we're going to be concentrating on in our work is to provide seminars and information for distribution to hardware stores and building suppliers on the assumption that, for the moment at least, that's going to be one of the main areas where the expertise is being rapidly recirculated.

From the point of view of the Ministry of Municipal Affairs and housing, our general analysis of the situation is that the big players in Ontario and in Canada, the federal government, the utilities, and the private sector, are going to deploy a lot of expertise and a lot of money and ensure that a fair amount of demand is there. The area that we are continuing to concentrate on is going to be trying to clean up the regulatory environment so it's not inhibiting, but in fact, encourages this kind of work, and getting information to consumers and to suppliers and to renovators and builders to help them carry out the work that we know is going to be important and going to be demanded by the consumers. One of our first practical steps is this project to weatherize the 60 houses in the 4 communities. We anticipate, that when this work is done, we will be able to tell contractors and homeowners exactly what steps are appropriate for what kinds of houses and publish information that is very how-to oriented, not theoretical. We anticipate, if our experience in the hardware stores is any example, a fairly dramatic impact.

Sebastian Moffatt:

He is head of Retrospectors, a company in Ottawa. Mr. Moffatt is co-author of the pamphlet, "Keeping the Heat in," a widely circulated publication of the Canadian Government and he co-authored the insulation manual of the Canadian General Standards Board.

It's been our own experience when you go into a house and provide an objective, thorough analysis with a step-by-step action plan and a careful description of the various projects you're recommending, the follow-up is tremendous, and that in the competitive world rapid development and competition are going to develop around energy conservation services. Very few businesses are going to be able to afford not to in some way be connected with that kind of consultation service. As the software packages get developed, as they are, very rapidly and very effectively, it's going to become possible for many businesses to provide that kind of consultation service. What we're finding is that, if we've gone into a home and delivered that kind of service, the uptake on our recommendations, at least on some of the recommendations, is in the order of 70 to 80 percent and that kind of figure is collaborated by firms like ours in the States. One example is Energy Works in Boston, a well known energy audit company that's done a lot of the software design down there. They provide a totally integrated kind of retro-fit service where they first go in and offer an audit and they get paid for that — you don't have to follow up on it at all. Then if you do want a follow up, they come back with a full range of services.

At first, when I started a business in the area doing audits, it somehow seemed incompatible, a conflict of interest almost, to be providing advice like that and then following up. But in fact, if you do a good job and people trust you, many of you in business will know that that's not the case and, in fact, people want you to be able to follow up. It's especially true in the area of air tightening. That's how we got into the business. We were often coming across with advice that the first priority in your house is to tighten it. The householder says who's going to tighten it? I don't have the time what with all these areas and materials you're talking about. There wasn't anybody in Ottawa at the time who was offering anything near comprehensive air tightening service and that was just a year and a half ago. Now there's a couple of firms and soon there's going to be many more. It's a whole new trade that's developed. It's part of a rationalized sector and it's clear from the work we're doing on this project that it's not something that very easily combines just with consultation.

Just to finish up on the question of what kind of market exists, I'm going to present the kind of service that I think is very profitable for homeowners and for the industry. I'm talking about a business that's going to offer an air tightness service. Whether they offer other services doesn't matter at the moment. It's clear from the figures here that it's profitable in and of itself, even if I'm partially wrong in my estimates. I've got two people on a fan for a full day in a house, doing the best they can. Retailing those two people out with a fan at about $35 an hour and using about $110 worth of materials retail, that's a $390 bill for the homeowner. The actual cost to the contractor, depending on what they pay their workers and so on, would be in the area of $200. Now, with the other kinds of costs the business has to cover, like equipment and training the people, and promoting the service, overhead on the business, supervising, and the truck, and so on, you can still see that what's left over for the contractor in a day's work is still a reasonable profit.

Now this is, of course, simplistic, and the service as it has probably developed, will invariably include some kind of ventilation package appropriate to the home, so you can add on another $100 to $150 for some fancy, automatic ventilation package which would be geared on a humidistat or on the burner operation, and so on. It's unlikely that people will just go and tighten homes. If you've got somebody who's skilled and flexible, dealing with a lot of materials, they most likely will be putting on low flow shower heads and insulating the water tank and taping up the forced air ductwork, and all these other small tasks that will nicely fit into a kind of general preparation package and are extremely cost effective. However, assuming that we just keep it at air tightening, we've got a $390 service. From the existing data it looks like we'll achieve something in the order of 30 to 50 percent reduction in the air leakage in that home. Now, for the homeowner with a fuel bill (and this is average in the Ottawa area) of $900 next year, that homeowner is spending, of the $900, about $300 in that range, just to heat up the air that's rushing in and out of the house, and a 30 to 50 percent reduction would mean $100 to $150 saved per year, or a simple payback of 2.5 to 4 years. You can't beat that with attic insulation or anything else right now in the Ottawa area. So it's fairly attractive for the homeowner, and it's definitely a viable business, and I think it's a kind of service that we'll see springing up all over the place, especially as the techniques develop.

Just a final comment on the marketability of a service like that: we've offered this service to a number of homes without any problem and people even though there's not something very visible left in the house, are quite happy to pay that kind of sum. The cost argument is an effective one by itself, but as David was pointing out, there's a certain degree of safety and protection that comes from tightening your home in terms of the integrity of the building envelope. There's all the comfort and that's a big seller. You get less cold drafts and a much more even temperature throughout the home. So, besides the economic returns, there's a very strong argument, and I think we're going to see a tremendous interest, especially when the market is so huge. There are a very few homes that can't benefit from that kind of one day service.

If you went in and tried to gear the service to the homeowner, what you'd have, I think, is a series of options. One would be to go and say we'll use the door fan and unskilled workers, to find just the worst leaks in the house. We'll rate them so that we'll know the extreme and major leakage areas, and we'll just concentrate on them in our one day service to get the greatest reduction in air leakage in the home. That might appeal to some homeowners who are going to have a contractor do all the work. Another option would be to say we'll just concentrate on the most cost effective things. We're not going to spend a lot of time clearing junk from basement walls; we'll go into the easiest accessible, least costly, least time consuming areas. Another option that we've had to consider is going and saying we'll do the most difficult areas of the house. We'll do the windows, we'll do the fireplace plug, we'll go up into the attic and get messy and dirty. The easy caulking and tightening and gaskets and so on in a house, we'll leave up to the homeowner. For the home handyman, that's a good deal.

I'm just explaining how the service will adapt itself to a lot of different kinds of homeowners, and consequently, the market is potentially quite large. It's a really new area, air tightening homes, especially existing homes. We've seen lots of evidence even here at the conference of the amount of good research that's going into air tightening new homes, but when you look at the distribution of housing stock by age in Ontario, you'll see that more than a quarter of the homes that will exist in the year 2000 in Ontario already were built before 1945. In fact, over 80 percent of the homes that will be around here in the year 2000 are already on the ground.

If we're talking about air leakage control in housing, we're talking about existing houses, and that's definitely where we need more information. The lack of information right now is incredible when you consider the kind of costs and the kind of industry that developed around building homes. Why that's the case, I don't really know. It seems that we know a lot more about aircraft engines, or computers than we know about housing. It's a real "craft" industry, and there isn't a lot of rigorous study done. It's hard to know what, in fact, is happening in homes with air leakage. The number of questions is simply overwhelming, and we're very ambitious in the project, trying to address as many of those as we can.

We don't really know how leaky the average home is. We, in fact, don't even know how to test well and cheaply. Very sophisticated computer models developed both here in Canada and down in the U.S. have tackled the problem taking into account all kinds of factors to predict air leakage in housing from its exposure, the height of the house, the temperature difference inside and outside, the type of ventilation systems, heating systems . . . and even then it's very hard to predict what's going on. You get tremendous diversity of data on a house in terms of the costs and the rate of air exchange. We'd like to get a better handle on what is happening with homes.

I started doing energy audits before I got into air tightening, and we'd be very, very accurate in our figures in terms of conductive heat losses, that is, the heat cost for the transmission losses through walls, basements, walls, windows, attics. When it came to air change, we'd have to guess at it and there were at least ten different methods of guessing it and they all gave you different numbers. There was really no way of knowing in fact what ballpark you were in. It just skewed the rest of your results to the point where it made you look ridiculous going to any kind of calculation to guess at the real divison of heat losses in the home. That's why we experimented with the use of pressurization equipment as a method for in fact giving us a more accurate number on that huge heat loss in the home. I think we're still a long way from using the door fan as a means of putting a dollar figure on that air leakage cost, but, eventually, I believe we'll get there.

Projects like we're involved in will try and develop a kind of relationship between housing type, air change under induced pressure conditions, and the seasonal infiltration — exfiltration losses. A house with stucco on the outside has very little air leakage through the walls and, you know, the report that is being presented today shows results from the National Research Council where very similar houses — all built within a couple of years of the same style, same city, were tested for infiltration rates. One house had 5 percent air leakage through the walls, and another had 75 percent and the difference was a stucco veneer. It's those kinds of features that we'll be looking for to help contractors and homeowners determine what's going on in different kinds of houses, and pinpoint the key area to focus on.

It's lately become apparent that leakage is distributed throughout the whole house in many unique ways, depending on the style of house and we're trying to get at that by sequentially tightening and testing various homes to determine where in fact leaks are distributed in housing. Some of the other issues that we'll be addressing are the potential for energy savings from tightening homes. That's probably the key question that'll come out of the project. By thoroughly tightening a lot of existing housing and monitoring the energy consumption, our sample's large enough, I think, to give us a fairly reasonable idea of what the potential really is. The fresh air requirements are something too that's a huge hurdle that's facing the development of this particular sector of the retro-fit industry just because so many people feel that houses have to breathe and are worried about pollutants and humidity and combustion air requirements. With questionnaires and careful monitoring, we'll get a lot more information on that from the project.

Finally, it's the first really serious test in Ontario using different kinds of materials, and all the new technologies now available to tighten homes and see what materials are most effective. I think, in view of what's happened with the insulation sector in Canada, where the huge expansion of activity that happened five — six years ago resulted in an incredible amount of shoddy and poor workmanship, safety problems, health problems and a lot of bad press, that, in this area, it's especially important to avoid that type of problem by clearly defining the best materials, the real fresh air requirements in homes and the proper techniques for tightening homes.

I think this project is really exciting in that it integrates very closely the research and the private sector development. We've got lots of contractors involved and so on.

We looked at houses and decided we wanted to get a sense of where we should tighten the house to tighten a house completely. The report indicates the time requirements for the work we've been doing. We've been extremely thorough but it can take you a long time to tighten a house.

The information over the last few years on housing has tended to emphasize the easy nature of tightening your home, to say. It's a task that can best be delegated to the interested handyman and the homeowner who wants to get it over with and hire a contractor to insulate. In fact, it could be almost the other way around. It takes so much patience and skill and knowledge and materials and a knowledge of how house operate and of heat loss and ventilation requirements, that the area that demands the most skill and knowledge is, in fact, the air tightening. It's not necessarily that easy a task. Anybody who's tried to tighten their own home will know that already.

To get a better sense then of where those leaks are occuring, we divided the house arbitrarily into four different areas and each area we tighten as well as we can. Then we're doing an air tightness test to see the kind of reduction we're getting from tightening the different building components. We divided the home into openings which deal with all the windows and hatches and the milk chutes and the fireplace damper, and so on, areas that open directly to the outside and require weatherstripping. Secondly, we have a category of cracks; that's all of the minute leakage areas that circuitously empty warm air or bring cold air in through cavities in the home. The third area is the foundation wall, and the fourth area is the attic or areas leaking into the attic and we call that whole component "bypasses". So we've been going in in that order and sequence, thoroughly tightening homes and testing for the kinds of reductions. We're hoping to get a sense of which areas people should focus on or contractors should focus on, in various types of housing and what the expected kinds of savings will be from, say, tightening a foundation wall and so on.

I'm going to just briefly review some of the preliminary results and some of the problems that we ran into in the first few homes. The first major difficulty we ran into was in actually using our door fan. We've been using it for almost a year now, but we've never done so many tests in one house, nor in the fall when it's so windy. We ran into a lot of bad data. We couldn't get the correlations we needed, even after spending 25 minutes sometimes, because of high winds. We've managed however to make some changes to the technology to help dampen the effect of large winds, but it's still a serious problem when you look at the air tightness test as a quality control device and a standards testing tool in older homes all year round by contractors. We can't afford to wait around for a calm day. The serious effects of wind on skewing the data and disqualifying the results is something we're still working on but I believe can be solved with technical improvements to the fan. It's especially a problem because we're using the pressure difference between indoors and outdoors as a means of determining air flow in a house, and that pressure difference can swing back and forth quite a bit depending on the exposure and the wind outside. We're using taps on four sides of the house now with capillary tubes that dampen the effect and to average it out in some high winds. Even that isn't sufficient to get a steady reading on the air tightness test. It's winds over 20 Kilometres per hour that are really killing us on the testing of houses. They average 15 Kilometres an hour in Ottawa and, of course, over 20 is not uncommon.

I have the results of the first three houses. What I did look at was the reductions that we got in the houses and the amount of time that it took. The reductions were lower than we expected and lower in fact than we've been getting on other homes in our own business. The average reduction was 26 percent in the equivalent leakage area, as tested under induced pressure with the door fan. Now, we've seen reductions of over 50 percent in some houses, and studies in the States have shown reductions anywhere from 5 to 96 percent in homes using similar equipment. It was of serious concern to us that after such a thorough job, and using the best materials and trained workers, we could only get an average of 26 percent on the old, leaky homes. That's still a very significant reduction because they're so leaky, but we wonder why is not the reduction more than that?

It would appear that first there were many diffuse leaks which we simply cannot locate and seal.

Secondly, there's a few areas in the home that we just don't have the materials to tighten properly yet. An example would be the pulley holes in these double hung windows, and in the old Ottawa homes, how do you plug a pulley hole? You can't tape over it without causing a point problem and cosmetic difficulties. You can try stuffing it with a little foam and pulling the cords so the foam winds its way through, but that does not work very well, and is certainly not a long-term solution.

Another example is sliding windows and sliding doors. Unless you're going to go to the expense of putting on some kind of plastic inside storm or replacing the whole thing, you've got tracks that leak so badly that there's little you can do. A temporary solution that we've found is to use a new kind of caulking which is called "Seal and Peel" which is a clear caulk that goes on, almost invisibly, and then can peel off after the season. That's again a temporary, and not the most effective solution.

Some more examples are in these older homes where the sub-flooring is made of planks that go on top of the foundation wall. You've got cracks between each of those planks, and there's cracks in the planks themselves and actually behind those boards is a whole labyrinth of circuitous air leakage passageways that are impossible to access with normal equipment, unless you're going to be drilling holes from the basement up into the subfloor and pumping foam or something. The only effect of our caulking along the edge there was to simply force those air leaks into other locations, and not really to tighten the home as well as we had wanted to.

The most serious problem we had was actually locating air leakage in attics. We're going at this whole approach without using a thermographic camera, unlike the work that people are so familiar with down in Princeton. Our feelings on the use of thermography now is that it's too expensive for most firms to use properly and we're not sure that it's necessary either. In Ottawa, attics are typically insulated by C.H.I.P. already with 10 inches of loose fill and you can find the standard leakage spots surely easy enough, the plumbing stack, the chimney, some of the exterior walls, and lighting fictures. But when it comes to cracks and holes and gaps along the tops of the sills, the partitions, walls, or major unknown leakage spots, we don't know where those exist, and the low amount of time and the low amount of reductions that we got for attic insulating is a reflection of the problem we're dealing with going into these homes just with smoke pencils and air flow meters and without an infra-red scanner to find the leaks. We're going back hopefully to a couple of these houses with a scanner to see the difference we can make by finding the leaks with the better diagnostic technology.

A final problem we ran into in the tightening of home and making the reductions larger was in getting access. The most serious area, as anyone in the business will know, is the basement walls because they're covered with junk and they're often insulated and finished, and getting at those serious leaks is next to impossible. The second area is like knee wall attics, crawl spaces, and so on, where you have to cut a hatchway and it's an added expense and trouble that may not be warranted. I should point out that it is clear from the amount of time it took us that it is not a half day job to tighten the outer drywall of a house, regardless of the age. A full day can easily be spent so that two people concentrate on those leakage areas. It can be really time consuming where you have to tighten up all the partition walls as well as the exterior walls because they often leak just as badly. The windows have to be treated very, very gently or you're going to make a lot of problems with the paint and cost effects, and so on. It's becoming obvious that it's still cost effective to spend that time, but the time is definitely warranted, and it shouldn't be a two hour job before insulating or a 2.5 hour piggyback on an energy audit, or something.

The thing that we should promote in a responsible fashion is a thorough air tightening. Those are a few of the highlights.

CHAIRMAN: DAVID PETERS

It's certainly an emerging market that I don't think that anyone who's curious about need worry about being saturated. When we started to develop the plans for this project, we scoured Ontario and found four contractors. One is from Winnipeg and recently arrived in Ontario, as one of the earlier pioneers in this field; Sebastian's firm in Ottawa; Resource Integration Systems who have been operating in East York on a pilot project for some time and Can-Am Air Leakage Control, also a recent arrival: those are the only firms we found which really had enough experience to do this work for us and had the proper equipment to carry out the testing. So it certainly is a new field, and I think you can see from the very frank way we've answered your questions and displayed the information we're not really at the stage yet where we have snip-snap answers to the questions. We do know that there are major savings to be made here, we do know that it's absolutely vital to try and get this general information out and at the same time, to develop it into a much more detailed understanding of what should be done where in most houses.

12 Home Heating: Energy Alternatives

Gord Patterson:
Director of the Energy Conservation and Utilization Division of Ontario Hydro.

I have a number of slides that I want to show as I go through the procedure. This is a picture of an electric furnace with a water heater beside it. Although you may be aware of the conventional electric systems, you may not be as aware of the newer electric dual energy systems and these include units such as the plenum heater, which is installed in the deplenum of a furnace. These can be coupled with all furnaces including gas furnaces. In this device, electric elements are inserted into the plenum of the warm air furnace and a new two stage thermostat is installed. This thermostat is similar to a conventional thermostat except it has two stages. The first stage brings on the electric elements — when the thermostat calls for heat. If it is quite cold outside and the temperature in the home drops a degree and a half because of the amount of electric heat installed is not sufficient to maintain the desired temperature, then the first stage of the thermostat is locked out and the second stage brings on the fossil fuel furnace which is tied with the plenum heater. The thermostat will always try to satisfy the heat requirements with the electric heat elements.

There are presently five manufacturers with plenum heaters in Canada although to date there are only two that are approved by the Canadian Standards Association. The others are in the process of getting approval. There are some sophisticated controls that may be used with these plenum heaters to prevent overloading the main electric service switch and thus reduce the need for the installation of a higher ampage service entrance facility. One method utilizes small current transformers in the main service switch or an adjacent sputter box which limits the current through the main switch to a predetermined amount and it's on the bottom of the box — the current transformer which is around the wires — it's an orangy coloured sort of donut shaped current transformer which measures the current through the wires. On a 100 amp service, the controls could be set to limit the current to 80 amps. A plenum heater in a 10 kilowat circuit with other lights and appliances could draw a total of 80 amps and if that home owner happened to turn on a clothes dryer, then that controller, by the use of that donut — could then turn off one of the electric elements in order that you don't overload the main fuse. Assuming that the load remains constant when that dryer is then turned off, the plenum heater would then be turned on again. This switching takes place automatically. We have installed over 50 plenum heaters on existing oil fired furnaces in employees' homes. This will be our second winter of operation of these plenum heaters and to date, they have backed off about 65 of the normal oil useage within those homes. Now this percentage will, of course, depend on the electric heating capacity you've installed in that home and in our test cases, we have put in just sufficient so we don't have to change the main services outbreaker.

We have also had a test using baseboard heaters in 12 homes in Oshawa and the installation has ranged from three kilowats to 5.5 kilowatts and these have supplied on the average of 78 of the heating requirements within those homes — the highest being about 97 when we've installed only 4.5 kilowatts so it can back off quite considerably the sue of oil.

An add-on heat pump may be coupled with either an oil or gas fired furnace. This may also be controlled by a two stage thermostat. Both of these dual energy systems have the advantage of reducing a home owner's dependence on fossil fuels and of keeping the electrical utilities rates lower than they otherwise would have been due to the fact that they are not utilizing electricity during the time of their peak in the winter time. This graph shows an electrical load pattern — a daily load curve on a typical winter's day. You will note that it's about 6:00 o'clock in the morning; people get up and leave for work, the load starts to increase. It hits a peak just before noon. That almost indicates that the peak is on noon but normally it is just before noon and then dips down over the noon hour and then increases again, hitting its highest peak around 6:00 or 7:00 at night. Depending on the extent of the night set back in the heating system, most of the heating required would be during this lower demand period.

The annual load curve also varies not with a similar type curve but over the year, with the maximum peak occurring in the coldest weather. When this lowest temperature is reached, normally with a dual energy system, that's when the fossil fuel system is in operation and it doesn't ride across the electrical peak. The add-on heat pump has a further advantage of reducing the home owner's electricity bill because they have a seasonal efficiency of between 2 and 2.5. This means that you get 2 to 2.5 units of energy out for every unit of energy that you put into it. They are actually a heat transfer medium — not a heat production medium.

Another thing with that type of system, you will also use a fossil fired system during its most efficient period.

Energy efficient homes designed to take advantage of available passive solar energy will greatly reduce the amount of heating and cooling energy required in a home. Electric heating systems can be designed to match the individual needs of these homes.

Tests have shown that energy efficient homes built to the Canadian Electric Association energy efficient and Super Energy efficient standard not only have reduced heating demands on our system but also have increased load factors which improves the revenue cost picture. Improving the energy efficiency of the residence, works to the advantage of both the home owner and the electric utility. Electricity is supplying between 20 and 25 of the new residential market at the present time. What the future holds will depend to a large extent on whether super energy efficient passive solar homes are accepted by the residential construction industry and the buying public.

The passive solar home program we are conducting in co-operation with the Ministry of Energy and HUDAC is designed to give the building industry experience in working with these more stringent construction techniques and to show to the buying public that these homes can be pleasing to the eye and functional as well as cost effective. It takes some selling job both to the building industry and to the buying public to promote passive solar energy efficient homes.

With regards to relevant costing of fuels, I doubt that we can get agreement within this panel at the head table regarding the relative price of heating fuels today let alone what the future holds. I will predict however that gas and electricity will continue to supply most of the internally generated heat in new residences in the 1980s and 1990s and that decisions other than the cost of fuel will determine which of these two are used during most of the 1980s. In other words, there will be so little difference, it will be other determining factors that will effect the decision.

The conventional gas furnace which has been around for quite a while really hasn't changed very much for the last 20-25 years and has served home owners and the gas industry quite well by being cheap and reliable. Now it is starting to undergo some minor developments. The basic gas furnace that uses atmospheric burners is seeing some slight increases in efficiency as a result of the energy prices going up and people starting to worry about efficiency but these increases are rather small. We are talking about maybe one to three percent increases in efficiency. The other thing that quite a few manufacturers are doing to the conventional gas furnace is to add a couple of items to the basic furnace which will help the seasonal efficiency.

These items are the intermittent ignition device or IID and the flu damper. The IID eliminates the continuously burning pilot which you normally had in the gas furnace. In other words, there was a small gas flame there that was burning 24 hours a day, 365 days a year. The IID ignites the pilot when there is a demand for heat. When the main burner goes off, the heat demand is satisfied and the pilot is also shut off. This device will save you about five to seven MCF of gas per year.

The flu damper, which is the second device, partially blocks the chimney or the flu. When the burner is off it reduces the amount of warm air that is lost up the chimney.

At least in Ontario, the flu dampers are always sold together with IIDs because of code requirements and what you find is that the combination of the IID and the flu damper will save you anything from about eight to about twelve percent on your gas consumption if there is no water heater connected into the same flu. If you have a water heater connected into the same flu, this reduction, or the saving is reduced down to about four to six percent. The reason for this is that if you put the damper in the furnace flu and you partially block that during the off period you reduce the flow of warm air up through the furnace but because of the draft by the chimney, it increases the flow up through the water heater, thereby offsetting the savings. Both these devices are quite readily available — there are several manufacturers who have them available and the costs run, for the IID only, from about $120 to $140 at the retail level and for the combination of the IID and the flu damper, you are looking at about $350 to $400 at the retail level.

So that's what's happening with the basic conventional furnace. Going on to the next step, a new category of furnaces which will become available on the Canadian market in the very near future, possibly even before the end of this year. These units, which I will call the 'intermediate efficiency furnaces', offer significantly higher seasonal efficiencies than the conventional furnaces. However, there is a very definite distinction. They do not condense any of the water vapour that's formed by combustion. Since they do not condense any of the water vapour and in designing the unit, you have to avoid any condensation taking place, this in practice limits their steady state efficiency to a maximum of about 85. The intermediate efficiency furnaces all use either an induced draft fan or a power burner to move the flu gases through the heat exchanger and out through the venting system. By doing this, they eliminate the reliance on the buoyancy or gravity forces to vent the flu products and therefore these units can be vented horizontally out through the wall. In other words, you do not need to run a chimney up vertically through the house. Also, having a controlled powered venting system eliminates the need for a draft hood which you have on a conventional furnace and this reduces greatly the amount of conditioned air that is lost to the outside.

These intermediate efficiency furnaces which have been available on the U.S. market for the last year and a half or two years, will achieve great increases in seasonal efficiency compared to the conventional furnace. On the previous slide, I showed a conventional furnace as being maybe around 65 percent seasonal efficiency if properly installed. These intermediate efficiency units will achieve seasonal efficiencies in excess of 80 percent and this, in turn, translates into an annual gas saving of about 20 percent as compared to the conventional furnace. Since none of these units are on the Canadian market yet, the pricing is still a little bit hazy but talking to the manufacturers of some of the units that will become available shortly on the Canadian market and looking at the pricing in the U.S. as well, it looks like we are probably talking about a premium of about $400 to $800 over a conventional gas furnace, for one of these intermediate efficiency units.

One furnace is made by Harold Quacker in the U.S. There are items which are different on this unit. The primary item is at the top centre — it's the induced draft fan. In that location on a conventional furnace, you would normally have the drafthood. They have eliminated the drafthood, replaced it with an induced draft fan and they have some additional safety controls to prove flow. The rest of the furnace is basically the same as a conventional gas furnace. In terms of size and so on, these units are basically the same as the gas furnace that we are used to seeing.

Now, going on to the ultimate in gas furnaces — high efficiency units. These units are classified by themselves because they do condense some of the water vapour formed by combustion and recovered some of that latent heat in that water vapour. Again, all these units rely on a powered flow of flu gases through the unit and the venting system and since they generally reduce the flu gas temperatures to very low levels or below 150F, the venting can take place through small diameter, 1.5 to 2" plastic pipe and it can be again vented horizontally out through the wall. Also since condensation takes place in the latter portion of the heat exchanger, or heat exchangers if they have several, and since this condensate is slightly acidic usually with a PH level of somewhere between four and five, you need to use corrusion resistant materials in the parts of the heat exchanger and venting system that are exposed to the condensate.

To date, all the manufacturers who have either entered the market or are very close to it have decided to play it very safe and they have all opted for stainless steel or plastics although there is quite a bit of work going on in looking at various types of coded mild steels which would be considerably cheaper to use and might very well prove practical as well.

These high efficiency furnaces will generally have steady state levels between 87 to about 94 — 95 percent with most of the developments that I'm aware of being well above 90 percent of steady state efficiency. Also since there are essentially no off period losses associated with one of these units, the seasonal efficiency will be very close to the steady state efficiency and I think it's safe to assume that most of these condensing furnaces will have seasonal efficiencies in excess of 90 percent, which would translate into about a 30 percent or so savings on your gas consumption as compared to the conventional furnace. Right now, there is really only one unit commercially available on the Canadian market and that is the Clare-Megasave. However, I think they are in for some competition very soon. There is at least one other manufacturer that is in limited production right now. They are going to be installing something between 100 and 200 units in the field for this winter. There are several other developments which have not been quite as public about what they are doing but my sources seem to indicate that we are probably going to have maybe five or six condensing type gas furnaces available on the Canadian market by this time next year. The Clare Megasave is rather pricy. It carries a price premium of about $1,500 at the retail level over a conventional gas furnace. However, I think that's a question of Clare being the only supplier. Once there is some competition in the market place, I think you will see a significant drop in these prices and my personal estimate would be that the price premium by a year from now would probably be something of the order of $1,000 over a conventional furnace or possibly even less.

The Clare-Megasave unit is quite a bit larger than the conventional furnace. That has posed some problems in retrofit installations in terms of getting it through doorways and so on.

Another unit has been developed by Inter-City Gas or ICG and is now in the field on a trial stage. They basically used a conventional furnace but it has a third heat exchanger that condenses some of the flu products. It's a stainless steel thin tubing.

This is a shot of the Lennox Condensing furnace. They are quite different in that they use a pulse combustion principle which is rather novel. It's a real departure from traditional gas furnace technology. They are looking at probably coming on the market in very limited volume, maybe beginning next year and full volume sometime maybe mid 1982. The one advantage that they get from using the pulse combustion principle is that they can make their unit quite compact. It is really the same size as a conventional furnace of the same input but since it has considerably higher efficiency, it's output is higher than a conventional furnace with the same input so really it is more compact than equivalent conventional furnaces.

Another furnace that has been on the market in the U.S. I guess for about a year or a year and a half is made by an outfit called SJC and it is just marginally condensing. They have taken a conventional sectional type of gas furnace and they are letting the flu gases pass up to the two right hand cells, come back out frontward where the drafthood would normally be in a gas furnace and then they have made a third cell out of stainless steel — they force the flu product down to that cell to cool even further and then out through an induced draft fan and out of the building.

That's what we see coming down the line. I think there's going to be a lot of new developments in gas furnaces over the next little while. There are a couple of things I would like to mention at the end here and the first one relates to the fact that all these new gas furnaces incorporate some new technology. They are still basically very simple devices in comparison with something like a heat pump which is the other side's high technology development. As a result, I don't expect these units to experience the kinds of heating problems that heat pumps experienced back in the '60s and maybe early '70s when they started coming on the market. Also, the life expectancy of these high efficiency furnaces will likely be very similar to that of conventional gas furnaces and, in fact, most of these manufacturers are going to be offering a ten year warranty or in some cases, even a 20 year warranty on the heat exchanger. In other words, they will offer the same type of warranty procedures that they have on conventional furnaces.

The second point that I would like to leave with you is that in comparing various energy conservation options, I think, being in the mechanical side of this housing industry, I find that the heating system is frequently not given serious consideration as compared to extra insulation and better glazing and so on in terms of cost effectiveness. I really believe that it should be given equal importance and that you might find that it is more cost effective to instal the higher efficiency heating system than to raise the insulation levels far beyond the code requirements.

Harry West:

A technical specialist for Imperial Oil, Mr. West has had 22 years experience in the combustion and home heating field and is an expert in all types of oil burning equipment, particularly in burners used for residential heating.

I am going to address my remarks basically to the national energy policy and the realistic application of energy. Now the realistic application of non-renewable energy should be the principle objective of everyone in the position to make energy related offerings to the consumer.

These energy offerings should also be the most cost effective. We should offer the consumer realistic and obtainable cost benefits to suit his individual needs and not a 1 in a 1,000 long shot. Energy decisions are not to the consumer like buying a $1 Wintario ticket but a major cost component of an individual annual budget. The Canadian Oil Substitution program has as its objective to reduce oil consumption, oil for home heating by 50 percent.

Imperial Oil agrees that the National Energy Policy objectives are in the best interests of all Canadians. We know that these objectives will be achieved by substitution and conservation. Ever since OPEC dictated the increased costs of all energy, the home heating sector of the marketing of fuel oil, has undergone some very rapid changes. The sudden shift to alternate fuels has put some jobbers in the business they weren't sure they really wanted to be in. It seemed that they had three courses of action; get out — all the way out; stay and milk the business or find out what the consumer really wanted and what he needed.

Now everybody has an opinion on what was the proper course of action. Getting any two people to agree on a single course of action was clouded by the lack of basic facts. Imperial Oil Ltd. decided in 1979 to get the basic information required to determine what the customer really wanted. Our field research was completed in three segments. The consumer very loudly and clearly told us they wanted us to provide them with energy conservation products and to provide them with service plans for their heating equipment. The survey indicated that consumers were also scared and in some cases, they were damn mad about the price of energy.

What is Imperial doing about it today? Well, we are offering a full line of energy conservation products including an electric heater.

We are also researching the following products in field testing: blue flame conversion burners to be used for converting existing residential oil fired warm oil appliances and improving the efficiency. The burner will use only one percent excess air for combustion and be less than .5 percent away from complete combustion. That means that it will be burning at a 14.7 percent sealed two level. We need blue flame burners for our condensing furnaces. We are going to install some condensing furnaces this winter and monitor the fuel cost savings over conventional oil fired equipment. We are also doing some field tests monitoring. We are going to monitor 20 residences with dual energy systems; heat pumps and oil furnaces.

Oversizing in a lot of cases was a compensation for lousy air distribution systems. For 30 years, the oil companies have been using degree day weather calculations to deliver fuel oil. We are using the direct weather factors now to ascertain realistically what the actual size of equipment should be in homes. Weather required for actually heating, and the annual fuel consumption of 800 gallons: when you take the degree days that you accumulate, divide it by the 800 gives you a K factor of 9.75. You take 1,000 gallons and you get a K factor of 7.8. And if you take the K factor of 725 gallons, you come out with 10.75. The average fuel oil consumption in the city of Toronto for our 34,000 accounts is 725 gallons.

As you can see on the next slide, this is how you would make an application of K factors because it determines the weather and all the K factor says is, any time I collect a K factor for that home of 8, 9 or 10, I burn a gallon of fuel oil. Then if you do your calculations on farther, you can tell how long it takes you at the firing rate of that furnace to consume a gallon of fuel oil. On this example we have here, if it stayed at -35C in Toronto for a solid day, the longest that the furnace would run with a gallon of fuel oil would be 12 hours of a 24 hour day. Down at the lower end of it, with a .65 nozzle, it would only run 18.5 hours out of a 24 hour day to heat the home. How many furnaces in Toronto are fired at .65 or under and how many days have you ever seen it at -35 in Toronto. Next slide please. This is a chart where you go down and you have the K factor from 1 to 14. On the other side, you have the designed weather temperature for Toronto. You've got a K factor at 10 — a .35 gallon an hour nozzle. At 100 efficiency energy input is all required to heat that home. If you go down to 14, it would be .25 gallons an hour at designed temperatures remember. Not at 55 and 60 degrees. Next slide. If you follow this chart down, you can see what the optimum nozzle input — like .25 is 35,000 BTUs. .27 is 37,800.

That would be the required gross input into that residence — all the way up to .87 which is 121,800. But as you know and I know, there's not a heating appliance in the world that is 100 efficient and it is basically for that reason, if you go to the next slide, you know the efficiency applicance, you can actually dictate exactly what the heat loss of the residence is. So if you go over at .25, to 60 percent efficiency furnace in that house for the oil you are putting in, the heat loss of that house is 21,000 BTUs at designed temperature. All the way down to .70 at 60 percent is 58,000. Bringing you back to the blue flame burner that we are developing, it fires at .30 gallons per hour, for our conversions.

Oversizing heating appliances actually contributes to the misuse of energy so our program down the road is to fully ascertain what the real heating requirements for residences are and to address ourselves to that as part of our conservation package.

Dr. Irwin Fernbach:

A professor in the physics department of Ryerson Polytechnical Institute, he is an expert on wood stoves.

The question is, is burning wood truly an alternative energy for the consumer? The answer is — well it depends upon where the consumer lives. I cannot imagine that the wood burning device will take off in a large city. There are problems in delivery of fuel which are probably insurmountable. Secondly, the application of the fuel, the loading of the device with the fuel is rather cumbersome.

Nothing in this respect will beat electric energy, there's no doubt. As far as I am concerned I have a split personality. In the city, I am using entirely and exclusively electric energy but up north I am using entirely and exclusively wood energy. A wood stove or any kind of wood burning device in a room adds to the so-called atmosphere but this is really the only thing that counts. To use a wood stove as a heating device in the city is, in my opinion, rather cumbersome because it can in no way compete with the energy given by the electric companies for a very reasonable price. I also believe that the wood burning devices will, in the long run, be probably more costly than other devices.

There is now one thing that still makes wood burning devices, even though they are not nearly as convenient as gas or oil burning devices, a very good alternate energy source for a heating device and the reason is primarily that we do not destroy our environment or damage it or endanger it as you would with any fossil fuel. The question should be raised — why is that so? It is a very simple one. If you are looking at the trees that you use for fuel, we must realize that each one of those trees at the moment it rots will produce approximately the same amount of carbon monoxide and carbon dioxide and will produce he same amount of hydro carbons as this tree would produce if it were burned but during the lifetime of the tree, that tree has produced an amount of oxygen that is greater than the amount of hydro carbons and the amount of carbon monoxide and carbon dioxide during its decay. The only difference is that the time interval is so much shorter if you are using wood as fuel. This naturally is not, if it is properly used, a handicap. All that has to be done is to make sure that just as many trees are being planted as are being used for such a purpose or better yet, to plant, let's say, two trees for each tree that is being used as a fuel.

In locations where the population is not too dense and where wood is readily available, then I suppose that wood energy would be a truly viable energy source.

Now to come back to the efficiency of wood stoves. When I began my research about three years ago, I was wondering if I should get involved in this kind of activity. After all, wood has been burned for thousands of years and in this period of time, all the bugs should have been taken out and I should know everything there is to know about burning wood. I was very surprised to find out this is simply not so.

I found out that most of the furnaces and stoves that are burning wood are burning it at a very unreasonable low efficiency. In this case, I mean overall energy efficiency based on high collorific values. The efficiency levels for stoves were about from 35 to, in the best cases, 48 to 50 percent which means that the quotient of energy evolved from such device to the energy contained in the fuel is .52 at the best. At this time, the so-called air tight stoves came out but these air tight stoves always showed a great deal of problems. The first and foremost problem was that in no way did they cut down the evolution of hydro carbons and carbon monoxide. Combustion occurred at very low oxygen levels so that the burning period is simply extended over a period of, let's say, five, six or eight hours but on the other hand, a great deal of the gases still escaped unburned.

It was about this time, about three years ago, the very first attempts to provide an afterburner, if you want, similar to the afterburn devices that are being used in cars — namely catalytic combusters. The very first attempts led to some progress. Progress enough to make it promising. What has been done was actually very simple. The first applications were the same type of catalytic combustion that was used in cars. And it did, to a very great extent, burn the carbon monoxide and the hydro carbons in the products of combustion. But still, a great deal of the hydro carbons were left and a great deal of condensation of hydro carbons in the flu was the result. As research on these catalytic combusters increased, they could provide, eventually, a combustion efficiency in stoves that reached the lower 90s — in others, a combustion efficiency of 90 to 95 percent. The questions was, now, how to increase all the heat transfer efficiency? The product of these two would provide now the overall energy efficiency. The latest figures that I have measured are in the neighbourhood of 75 to 76 percent which means, in other words, that wood stoves are not comparable in efficiency with the gas and oil fired furnaces and gas and oil stoves.

The problem with wood burning devices is that they are costly — rather costly. A furnace in the 100,000 BTU per hour range costs approximately $2,500 to $3,000 which is considerably much more than the cost of a similar power output in oil and in gas. Again, I must naturally say that there's a disadvantage and the disadvantage is that you would have to fire these things or stoke these things at regular intervals and it is this very factor, which I call parameter of performance, the inconvenience of producing a supply for fuel.

Nothing is more convenient than a gas or oil furnace or an electric furnace obviously. You simply switch it on at the beginning of the burning period and then you do not worry until you switch the whole thing off.

Again, here, there are new developments already undertaken so that within a year's time, I do suppose there will be wood burning furnaces on the market which are fired automatically. In other words, all you have to do is provide space for a bin to contain the wood. The wood then will automatically be put into the primary combustion chamber at a rate at which the burning is required being controlled by a thermostat.

Another way of producing heat by means of wood as a fuel is the gassification process. Gas that is now evolved from the wood is being burned very similar to the way in which the standard natural gas is being burned using very similar muscles. Here one problem is the wood would have to be prepared first. The wood would have to be gassified in a process that will be somewhat costly. The process itself would take in a considerable amount of energy which, in turn, would then cut down on the overall efficiency of stoves.

So, in general, I would say that wood stoves are a very marvellous thing. It is very nice to have a wood stove in the home. It gives a somewhat romantic atmosphere but that is about all that it gives.

In a cottage — if you are a cottage owner — things are naturally a little different because you simply go out, pick up the fuel free of charge. You are putting it into the proper size which means that you have to do some exercise which is good for your health so in this particular case, I would say as a cottage owner, I would stay away from the electric furnace, I would stay away from an oil furnace, I would stay away from a gas furnace. In this case, I would say 'yes'. The only alternative energy for heating a home would be a wood stove.

Dr. William Stevenson:

Executive Co-ordinator of the Strategic Planning and Analysis Group of the Ontario Ministry of Energy. Dr. Stevenson has many years of experience as a fuel economist and was employed by the Tennessee Valley Authority and by private industry. He was a commissioner with the Porter Commission on Electric Power Planning for Ontario.

What I am going to do is to tell you about the status of an ongoing research project at the Ontario Ministry of Energy that's looking into the financial side of the consumers' home heating alternatives and I want to emphasize that it is an interim report. The work we are doing is not complete. We have had one round with industry so far in that we have produced a draft which has been circulating and has been generating a great deal of comment on all of the assumptions and parameters that have been mentioned today. What we are doing now is incorporating a revised set of assumptions into our analysis based on this review and of course the new energy price projections that came out of the Canada/Alberta agreement of September 1. So what you are going to see is based, I'm afraid, on assumptions. I don't want you to take any of the figures I'm going to be using as gospel at this stage.

Between 1973 and 1981, the price of all home heating fuels in Toronto increased very sharply as everyone is aware. Home heating oil by over four times, natural gas about three and a half times and electricity somewhat more than doubled over these years. Under the new Alberta/Canada agreement, the price of home heating oil is expected to again double by 1986. Natural gas is of course cheaper today than oil. It will also double under the agreement but is expected to remain cheaper than oil. The agreement calls for a rough parity between the City Gate price of natural gas and the Refinery Gate price of oil at about 65 percent. Electricity, already cheaper than oil in almost all parts of Ontario, is expected to rise more slowly than the price of oil and gas. Ontario Hydro is forecasting that its price increases this decade will be at or below the rate of inflation.

Now assuming there are no major revisions to the structures of rates, it's probably that electricity and natural gas in the space heating markets will be competitive, very competitive by the mid-80s and this is shown in a chart where we see the prices of natural gas and electricity, converging at a point somewhere within the next five years, both remaining substantially and increasingly below that of home heating oil. This merely confirms what Gord Patterson of Ontario Hydro said in the opening remarks; that we are going to see real price competitiveness in these two fuels over the next few years. That particular chart is based on a 10 percent per annum increase for electricity prices and the forecasts for oil and gas, as I mentioned earlier.

Now of course as everyone here is aware you can't make the kind of comparisons that I've made there without making some assumptions about furnace efficiency. I think our seasonal efficiency figures in this chart of 65 for both oil and gas furnaces are not too out of the way although, as you have heard today, those are not necessarily agreed on by all and everyone can do his own analyses and it will produce slightly different results. I'd leave you with the impression only that the relative costs of home heating fuels are changing. They are changing in favour of natural gas and electricity and they are changing particularly in favour of electricity if these forecasts are correct.

Now the question is, what can the home owner do to contain his home heating costs increases? I don't think anyone would argue necessarily with the statement that the first thing to do is to try to limit your home heating requirements by taking low cost energy conservation options around the home — insulation, weather stripping — and taking advantage of CHIP grants and, if eligible, Ontario Hydro's new residential energy advisory program. Gord Patterson was so modest, he didn't even mention it today but it is a program which offers loans at something below market prices for energy conservation and other purposes associated with electric heating. So obviously, you take advantage of those where you can.

The other thing you can do and this certainly has been mentioned too by Harry West is to improve the efficiency of an existing oil furnace by installing retrofit packages, the flame retention heads and others have been mentioned.

The third set of things you can do is to supplement your oil heating system. We've had a description today of how you can do this by electricity, by wood, solar energy (solar hasn't been mentioned today) or you can replace your oil furnace entirely, as we've heard, by conversion to another fuel. Now for each type of fuel, there are, of course, a wide variety of technologies and assumptions even within the natural gas furnaces as we've heard.

There are several different technologies available to you either now or in the near future. For electricity, an array of options that a few years ago we didn't even know existed: the plenum heater option together wih the standard baseboard electric furnace; then add on a full electric heat pump option.

Now which for the home owner are the best choices? From a financial point of view, essentially the home owner has to trade off the future fuel cost savings that he anticipates that he is going to get against the upfront capital cost differences. That's basically all the Ministry of Energy analysis is designed to do in the interests of helping that home owner make the best choice.

To make the analysis that we did, we had to make a number of what are really fairly heroic assumptions about heat requirements of "typical homes". You know, there aren't any typical homes. Harry West has said that in Toronto about 735 gallons of oil I think was an average for his company's customers. These are the kinds of assumptions you have to make to start with if you want a generalized analysis of the kind we are doing but it won't necessarily apply to a poorly insulated frame house in Cochrane, of course. Then you have to make assumptions about the proportion of heat to be supplied by the different heating systems. A lot of research needs to be done to get the answers to those questions.

I've already indicated how controversial seasonal efficiency can be. Equipment lifetimes are a problem. Capital and maintenance costs — it's very hard to get agreement on some of those. Fuel price projections — everybody knows how tough they are to make.

We've also had to make a number of assumptions about some of the little things that you don't think of but which can effect capital costs quite considerably. For example, $100 for removing the oil tank. Whether you have to add a chimney liner. Now, mostly when you convert from oil to gas, if you have an outside chimney, you will be required to install a chimney liner. Now this is going to increase the costs of your conversion to natural gas furnaces by several hundred dollars. We've talked a lot about upgrading electrical service to go to the electrical options. If you have to go to 200 amp service, you've got an outlay there of quite a few hundred dollars to consider. If you can do it by load control as Gordon Patterson was talking about, obviously you investigate that first. You may have to modify your duct work. You may have to, if you have a wood furnace put in a back up system or keep a back up system if you don't want your water pipes to freeze when you leave home in the winter time. And then there's the very controversial area of giving an allowance in the heat pump analyses for the fact that you get free "air conditioning" out of that decision. What we've done, and it's not been accepted as necessarily valid but it's the best thing we can think of to do, is to offer a credit for the case of people installing heat pumps who, when they were making the furnace conversion decision, would have also installed a stand-alone air conditioning system at the same time. We've also done the analysis of heat pumps without offering that air conditioning credit so we have both types of analyses.

We've also incorporated, of course, the fact that you have, from the Canadian Oil Substitution Program, a taxable grant of up to $800 for most of the off-oil decisions that we have been talking about. We have also incorporated the fact that for most of the electric heating options, you either are now or, in most cases I hope, will become eligible for these Ontario Hydro REEP grants, that is to say, lower cost loans and we've incorporated a differential there in the electric heating conversions.

Here are some of the more contentious assumptions on input efficiencies — I don't need to get into details with you now. We've used 70 percent for wood furnaces for example, which has been challenged. There's not a lot of settled theory on this. We've analysed heat pump lives at both 10 and 15 years to see the differences in heat pump economics. We've looked at the contribution of add-on heat pumps to total heating requirements and there seems to be a tendency to accept something in the order of 75 percent contribution to the house total heating requirements if the heat pump works in conjunction with electrical resistance backup. Something closer to 60 percent of the total home heating requirements from the add-on heat pump if it works in conjunction with a fossil furnace. Heat pump manufacturers say that 60 figure is too low. Again, where is the load research to really decide? Well, it's always coming and for this kind of analysis, it can't come soon enough.

We did not look closely at the alternative economics of improving the efficiency of existing oil furnaces. Now this is going to be unfair to some people for whom this may be their best choice. You have a very efficient home, very airtight, don't use much oil or conversely have a very efficient oil furnace in the home, it may not be in your interests to convert away from oil. Certainly, you should look at the retrofit packages that we talked about and look at the economics of doing that. But we did find, if our assumptions are reasonable, that when you consider the future escalation in oil prices, almost all the conversion decisions off-oil provided financial benefits to the home owners compared with staying on oil. Whereas no general prescription is possible, the specific choice depends on the home owner's particular circumstances.

We are appearing to find some general themes that I think are worth reporting on. The thing that you may not fully realize is how sensitive the off-oil conversion decisions are to your choice of interest rate or, as the economist say, discount rates. They are also sensitive to the time period over which you make your assessment. We'll look at these and the financial criteria that you use in making the assessment. We choose to call this our base case. It's simply a representative example of the conversion decision facing the fellow with a forced air oil furnace. Assuming that there is some remaining service life left in that furnace so we can consider things like add-on gas burners and, as I say, assuming that he has access to slightly lower cost loans for his electric options, based on our analysis, this is the sort of thing we are finding.

I should say to you that we are using what we consider to be the appropriate financial methodology here of total life cycle costing because we think that what we are faced with here is really a cost minimization problem. All the options provide essentially the same amount of heat. What we are seeking is the one that minimizes life cycle costs of the decision. The analysis measures the discounted dollar value of the stream of capital, operating and fuel costs acquired for the various heating options over a specified time span — 15 years I think in our base case. Now, we have shown here 10 alternatives including the alternative at the bottom of the list of staying with your oil furnace — no capital costs in that decision — fuel costs only — it still shows no. 10 in this particular array. We also assumed that the purchase was financed with a three year loan at the bank and an interest rate of 18 and a quarter percent, which, when we did the analysis, was the current bank rate. We see here that the add-on heat pump, where we have provided an air conditioning credit of $1,500 against the capital cost to reflect the fact that it provides air conditioning as well, would seem to emerge as the superior choice. If you don't allow that air conditioning credit, then you will notice that the heat pump with air conditioning dropped well down into the array.

Now there are a number of little things here that experts in the room will want to know about. Did we, for example, recognize that when you put an add-on heat pump on a gas or oil furnace, thus concentrating the fossil fuel burn into the coldest three months of the year when the ambience is zero or below, that the efficiency in the conventional furnace improves. Well no, the analysis didn't take account of that. On the other hand, it has a fairly high heat supply assumption for the add-on heat pump and if you balance those two assumptions off, I think our analysis is probably reasonable. However, we are going to play around with those a little more and see if that is going to be what happens.

No one should leave the room convinced that an add-on gas burner is going to always be better than going for the high efficient gas furnace because that difference isn't significant. If you need a chimney liner on the gas options this would downgrade their rankings. On the other hand, some of the new things we are finding about these plenum heaters, especially the ones with built in load controllers that don't require upgrading your service entrance — well these things will move the rankings of the add-on plenums up a little bit because the capital costs will come down.

Here we look at the effect on the rankings of different assumed time spans for the analysis. Now the time span of the analysis is not necessarily the same thing as the assumed life time of the equipment but it can be a very important consideration for a home owner who doesn't think he is going to live in the house forever and who may not think that his furnace conversion decision will reflect in the price that he can get when he sells his house. He might say, well, I don't want to look at a 15 year analysis. I only want to look at a 7 to 10 year. This makes a difference in your analysis. What we've done in this analysis is to reflect no salvage values, remaining lifes or replacement costs beyond the cut off; 11 years in the low case and 15 years in the high case. If you do this, you find that the shorter time horizons favour the low capital cost options: for example, the add-on gas burner which pops up as No. 1 and penalizes the options with the lower fueling costs in the later years. For example, the high efficiency gas furnace. Notice how the high efficiency gas furnace drops down to the third rank in an 11 year analysis but if you give it a few more years, in the 15 year analysis, in which those fuel costs savings will factor in to the net present value, then the ranking improves and similarly with the full heat pump options. I mean, here are expensive front end capital costs which require a number of years before the fuel cost savings will justify their existence so the full heat pump options are fairly low ranked in an 11 year analysis. By the time you get to 15 years, they come back up quite nicely.

The next chart shows what happens if you use alternative ranking methods. Now we've been talking so far about life cycle cost analyses because the Ministry of Energy believes that this is the appropriate decision for most home owners but there will be many businessmen in this audience who will say, 'what about the internal rate of return on these investment decisions,' because this is the way businessmen often evaluate alternative investment options. Well, if you use internal rate of return, you will find that the higher internal rates of return do not necessarily give you the same choice as the ones which minimize life cycle costs. In other words, there can be differences. Using the internal rate of return, the standard gas furnace is ranked above that of the high efficiency furnace and that's because the internal rate of return puts a premium on the fact that the standard furnace has a smaller initial capital outlay and so that the return on that small initial capital outlay is quite considerable whereas under the life cycle cost test the total savings from the efficient gas furnace swamped that effect and give you the lower life cycle cost. Perhaps it's easier to think of making a $100 investment in a furnace which, over its life, will save you $300 in fuel costs. That gives you a very handsome internal rate of return compared with spending a thousand dollars on a furnace option that will save you $2,000 over its life. Now in the second case, you have a higher savings. You are saving $1,800 more than you are in the first case and that will tend to give you a very good result in a life cycle cost analysis whereas the $100 investment decision will be favoured in the internal rate of return analysis so you have to watch these in what you do.

So, the conclusions that I would like to leave with you are these: fortunately, I think, for the home owner, bewildered by the variety of information he is getting on his off-oil options, at the very high cost of capital today, which tends to compress the life cycle costs of the options open to him, there is a wide range of choice open to him where the differences in life cycle costs are not very significant. Another way of looking at it is you can't go too far wrong in making an off-oil investment decision, according to this analysis. If interest rates were six percent, you'd have to be much more careful but at 20 percent, it compresses the choice.

We will be releasing a report soon when we are able to complete the analysis that I've reported on today. It will never be acceptable to everybody at this table, to say nothing of the audience generally because there are too many controversial assumptions and analyses but we hope it will be of some value to the public of Ontario who are in need of assistance in this area.

QUESTIONS & ANSWERS

QUESTION: (WILL STEINS: Saskatchewan Housing Corporation) I've been to three or four of the panels here and I have been hearing how there are not small enough furnaces. It is uneconomical now for gas companies to service new energy efficient homes with service lines and meters. In houses, we have two heat producing units; the furnace and a domestic hot water system. In Saskatchewan, we have, under two of our programs, a retrofit program and a new energy efficient home program, used a domestic hot water system to produce the entire space heating requirement in addition to domestic hot water heating requirement. We've done it in two ways: one way, we have just used a radiator from the existing domestic hot water tank through a ducting system and got our hot air that way and the other method, in a retrofit home and in a new energy efficient home, we just installed an additional hot water tank, a domestic hot water tank with a circulating system and used the radiation heating system. Has there been any thought to using the domestic hot water heating system rather than putting in, an additional heating system when we already have one that is very likely satisfactory?

Juri Otsason:
Manager of Utilization and Sales Development of the Consumer's Gas Company in Toronto. Mr. Otsason is formerly a research engineer with the Canadian Gas Research Institute and was involved with research and development related to gas combustion and development of high efficiency gas equipment. He is a professional mechanical engineer.

JURI: On the question of combining the space heating and water heating system, I think there's been quite a bit of activity particularly in Europe in that area. That's a fairly common practice, at least in gas heated buildings over there to use a small boiler that will provide both the space heating and water heating. I think the problem in North America has been that there was generally a demand for a warm air type of heating system both from a public preference standpoint and from cost standpoint. If you go the hot water route you then have a boiler supplying hot water to a warm air coil so that you still have the warm air distribution and that caused them to rule out that option. I would also like to comment on the furnace size; I believe there are gas furnaces available down to about 30,000 BTUs per hour. Somebody earlier in some panel made a comment that the lowest he could find was 60,000. There's quite a few available now down below 50,000. I think the lowest is 30,000. That would be a conventional gas furnace with a steady state efficiency probably somewhere around 75 seasonal. Some were 60 — 65.

QUESTION: Juri, could you say anything about the possibility of a high efficiency or condensing type hot water heater? What developments are there that might help?

JURI: There are some developments on high efficiency water heaters. I don't think it's practical or really possible to get the condensing type gas fired water heater because normally you would want your water storage temperature to be somewhere around 120 to 140F. The dew point that zero excess air for natural gas combustion is about 140 so you really can't get into condensation. You can probably get quite a bit higher efficiency than you have in a conventional one but not that high — 80 some or mid 80s maybe.

QUESTION: The last speaker mentioned that solar hasn't been mentioned today. Why not? A recent report of the Harvard Business School concluded that conservation and passive solar were the most environmentally and economically acceptable routes for the United States. Why aren't we getting cost benefit analysis for the solar option or is this lack of inclusion of the solar option due to the realities of March 19?

TOM McDONALD: (Chairman): I'll start by saying that one reason why we didn't put solar energy in the list of subjects is it didn't fit because the real topic here today is retrofitting existing homes. I'm not saying that passive solar is not good but it's not in the run-of-the-mill urban and rural dwelling in this country.

GORDON PATTERSON: I think the reason for not including solar as indicated, as a good one, as we were talking about the retrofit market. But there are tests going on within Ontario on various passive solar homes. The Ministry of Energy, and HUDAC in the latter part of the program, together with Ontario Hydro have been building a number of passive solar homes throughout Ontario. We will be testing the cost effectiveness of those homes over the next few years and hopefully will have some good cost figures that will convince the buying public that they are cost effective. The first number of homes that went in, 20 some homes, had various fuel systems. The last group of homes, 40 homes, all have electric heat systems. All of them have a back up system so that, regardless of whether you are looking at solar, you are looking at some of the systems we are talking about as back up so it depends then on the amount of heat required.

13 Housing Energy Management Products

Gregory Allen:
President of Allen-Drerup-White Ltd. of Toronto, Mr. Allen has been involved with renewable energy and, particularly, solar energy issues since his graduation from the University of Toronto in 1970. His company has been involved in the development of hybrid solar systems for residential and commercial use and in prototype development of air to air heat exchangers for residential use among other projects.

Much of our attention and many dollars are being spent in the supply end of energy in this country. An inauspicious revolution in energy conservation is taking place in all sectors. Most noteworthy, currently, is the automobile industry which has undergone significant changes in the last five years. We can expect to see the same shifts in the housing industry. There is ample proof now, that, at reasonable incremental costs, house energy consumption, particularly for space heating, can be drastically reduced.

The implication of these changes is far reaching. All sectors of housing industry planning, from standards, financing, marketing and users, will witness very significant changes in this regard. What I wish to speak of is the kind of products and technologies we can expect to see making more and more inroads into the housing industry in the years to come. Some of these changes are already being exploited, and we can see them, if we look at new housing that is going up now.

There are indeed changes: The days of 2 x 4 platform frames are numbered. Commencing with the building envelope of the house, the most noticeable changes are in attempts to upgrade the insulated value of walls and there are many products on the market now. Insulation sheaving is a growing facet of the housing industry. I heard yesterday that 11 of the housing in Canada last year had insulation sheaving and I expect to see it in practically all new housing in the next few years. There are a number of techniques being developed for generating even higher R-values in walls. These include: double-framing construction, modified balloon framing, interior strapping of walls and stand-off systems.

All of these innovations bring a demand for new kinds of products and processes for installation to meet the rising cost of energy and new construction techniques. I would anticipate that the kind of product a technologist will have the greatest inroads in, are those that most closely follow current practices in construction. It's not conceivable, with the diversity of the housing industry, that we're going to see revolutionary changes in our building technology. But we'll see changes that take standard practices and modify them to create more highly insulated and air-tight buildings. I can see that trusses may undergo some changes to combat heat loss in ceilings. We need more space around the eves for insulation. We need to deal with truss uplift problems, as a number of things are impacted by increasing the insulated value in our roofs.

The basement foundation insulation is undergoing a change right now. HUDAC is undertaking studies in the insulation of exterior, basement walls. It solves a lot of problems such as water penetration, frost heaving, cracks in the walls and, as a result of that, there is a demand for new products in the area.

How to coat the insulation, what kind of insulation materials to use — everything from rigid boards to foam boards, to semi-rigid fiberglass are being tried. And I would anticipate that, in the future, most houses will have basements insulated on the exterior.

The weak link in the (insulation) shell of the house is, the windows and doors. There hasn't been a general move towards improvements in this area for some time. In fact, it could be conjectured that the old storm windows were more effective than our current sealed units because the air space is larger. The problem with triple-glazing is some manufacturers reduce the air space in their units so they will fit, and the R-value one achieves by triple-glazing is jeopardized. However, there are a few manufacturers who have demonstrated that they can produce windows that are cost-competitive, at a small incremental cost, for the triple-glazed option. In fact, in one case we had a less than two-year pay-back from one manufacturer for triple-glazing and they generated air spaces in excess of half-an-inch between the glazing. The U.S. manufacturers are using a plastic film between the glazing. In one case, they have a quadro-pane (four panes) with three, one-half-inch air spaces. The weight is thereby reduced by using plastic film, and the solar absorption through those windows is improved (over glass).

So, there are lots of innovations and possibilities in improving windows from an R-value standpoint. Given that we may not see a very highly insulated, glazed window unit for some time, window insulating devices have made some inroads in the market place. It's a rather difficult technology because you have to deal with condensation and edge-sealing. The preference would be to put it on the outside. However, the constraints of weather conditions on those exterior insulators make it very difficult to build, and the cost has been exhorbitant. And so there is room for innovations bringing in low-cost night-time and seasonal, window insulators. We may even look to an ultimate window, perhaps one with an evacuated glazing that has an infra-red, reflective surface (on the glazing), and we'd end up with a vacuum window. I believe there are people attempting to develop the necessary technology to achieve this and, somewhere down the road, I hope to see it.

I mentioned doors as well. Doors have been relegated to being rather thin, but they are certainly improving . . . better air tightness on the gasketing and certainly some insulation, but there's much room for improvement. Given that we had windows of high R-value and doors of high R-value, I think I could deliver a zero heat-load house right now, it being the only significant remaining factor in the heat loss of a house.

I haven't mentioned the most potent improvement in housing that's taking place right now; and that is improved air-tightness. Usually this is done by making the vapour barrier in the house as continuous as possible. It is certainly desirable that, because of the humidity in highly insulated, well sealed houses ending up in the walls (condensing and causing wood rot), we pay more attention to achieving continuity of vapour and air barrier.

There are many products on the market now, such as plastic pans to which the vapour barrier is attached. But there's a need for products to use around flues and around duct-pipe penetrations of the exterior skin. And there is a demand for caulking materials that will remain resilient for a long time for sealing up the seams.

Changes in the insulation of these vapour barriers, and some of the construction details combined with some of these new products, will achieve a truly air-tight house. Obviously, there has been a lot of concern recently about the consequences of living in a plastic bag, and that brings me to the next area of technological development in new housing. The problem of ventilation in housing is a serious one that should be tackled now. In fact, it should have been tackled some time ago. It's not as if new air tight houses are an anomaly — we do, in fact, have the problem of air quality in existing housing, particularly in electrically heated houses where there's no furnace flue to induce air into the house and up the stack. As a result, we are getting high levels of humidity and probably other contaminants.

It's always seemed peculiar to me that our livestock buildings have plenty of ventilation. In fact, we have very tight specifications for providing ventilation for animals and yet, when it comes to where we live, there is nothing in the code that deals with minimum air change in the house. This problem should be dealt with, and I think the creation of air-tight houses affords us the opportunity to control ventilation and the air quality in our house. This can obviously be done with standard ventilation equipment — fans. One needs both an exhaust fan and a way of bringing the air in.

Having got to the point where controlled ventilation is a desirable feature in new housing, the opportunity for recovering heat from that exhaust air is too tempting. Our company, amongst many others in this country, are developing air-to-air heat exchangers for the purposes of extracting heat from the exhaust air, and warming the fresh air intake into the house. This technology will, no doubt, make major inroads and the pay-backs look very reasonable over a ten-year period. Once we've done all that, we've got very little heat-load left in the house and the result is that, we are making the existing heating plants in our houses obsolete.

We are now confronted with the severe problem of finding heating plants of small enough capacity for the demands, particularly in fuel-burning furnaces. There is a serious efficiency penalty for oversizing your furnace, and we are looking at furnaces with a capacity of 100,000 B.T.U.s when we have a load of only 10,000 B.T.U.s. But there are efforts in the industry to improve the efficiency of heating plants, and there have been some very dramatic improvements in that regard. There is, in the fuel-burning end, gas condenser furnaces that have a seasonal efficiency of around 90, as compared with, perhaps, 60 in conventional furnaces. There are also heat pumps, a variety of configurations and improvements on heating plants. But the size remains a fundamental problem.

The low-energy house is also creating a problem with servicing areas for gas — the low demand and the current rate structures won't pay for the service. Electric heating is likely to be a more attractive option because of the low capital cost of installation.

There are many new areas of development in providing heat to these low energy houses. I just came back from the Arctic where we had to equip our houses with the smallest space heater we could find, which was a 30,000 B.T.U. unit. The only problem experienced in these houses is, they overheat. People have to turn their space heaters off, even in 0° weather, because we can't turn the unit down low enough to prevent overheating. As I say, there is a tremendous market for smaller heaters for these houses.

We can see other opportunities for new product development in space-heating. Domestic hot water heaters may become space-heaters as well, because the load is very small. You can use a fan-coil or hydronic system to run off your hot water heater.

The next significant load in the house is domestic hot water. In fact, domestic hot water exceeds the space heating requirements in most of our houses. We can't ignore this. But there are several things which can be done, for example, a simple pre-heat system by which you put a tank in a room to soak up the ambient air temperature in the house. This may sound somewhat foolish in the heating season except that these houses experience excess heating problems most of the year. The solar house tends to need constant cooling, even during the normal heating season.

There is a product in the States that functions as a heat pump, and domestic hot water-heater. It just sits there, cools the surrounding air and heats the hot water. That has a certain appeal to me because, as I say, we do have excess energy to deal with. We may even see our refrigerators becoming conjunct with our domestic hot water-heating package.

There is another area for reducing the consumption of our hot water load. One of those is low-volume shower heads which are so popular. I can see a number of areas where we can improve on the washing power of water, without using the volumes of water we currently use. I would also assume that solar domestic hot water is going to be playing a larger role. Once there is a greater demand in this area, the cost will become more reasonable and we'll see quite a proliferation of domestic hot water packages in the country.

Another idea that has been playing around in my mind is, to recover heat from your gray-water system to heat your domestic hot water. There is sufficient energy, above the freezing-point of water, in your gray water, to do all that; and you can extract it quite simply if you use heat-pump technology. It was suggested that we use a large freezer, put a liner in it, run gray water into the tank, and change the condenser coils to make it a water-condenser unit — to circulate water from our domestic hot water tank, through that unit, cool the gray water and heat our hot water. One could expect an 80 reduction in the electrical demand for domestic hot water by taking that route.

You can see that there is a variety of new products that are open for development in future housing as there is a movement towards more efficient systems, lighting and motors. We can see the energized sticker having an impact, as consumers make judgments as to more energy-efficient appliances. In fact, it may become stylish to hand-grind your coffee and many electric gadgets may be displaced by hand-operated ones. The consequence of doing all this, of course, is, it makes the low-energy house look a little less attractive — a lot of the heating that was being supplied for the low-energy house (to displace space-heating) was from the occupancy gain. However, I think the effort is well worth it and we'll find other ways of creating that extra energy.

I haven't mentioned the renewable energy field because I'm dealing with the consumption side of technological development. But there are certainly many things that will be coming to the forefront in renewable energy options. It may not play that large a role on the domestic scale, although I notice that in the U.S. the first fully (?) is being marketed right now. I have problems envisaging this being a significant element in our housing in the future but certain enthusiasts believe that we're going to get the price to a reasonable level where there are opportunities to use that energy source.

New opportunities and a dramatic improvement in our residential energy consumption can be achieved: We have the technology and have demonstrated that it can be done at an affordable rate. Whether it takes place, and the rate at which it takes place in the market as a whole, is going to depend on several factors that are non-technological. Take the financing of these house — we need some innovative schemes by which a homeowner can see savings from year 1. Then too, we have to look at consumption in the same light as we look at the production of energy. For example, when we amortize the tar sands plant or an electrical power plant, we look at it over the lifetime of that project. The same should apply, in the residential sector, to the consumption of that energy. This means that our financial institutions are going to have to re-evaluate the existing structures, come up with mechanisms by which the consumer can afford to pay for necessary changes and eventually repay it over the lifetime of that mortgage.

Next is, the creation of the standard by which we can assess the energy efficiency of housing. A lot of things hinge on the promotion of this. The financing of energy conservation in housing, marketing, and various developmental elements are going to depend on whether or not we have a valid way of determining how much energy these house are using; how we can compare one house against another. This is curently under way and, hopefully, we'll see some development of that next year.

The last item is that, a lot of these new products will require a good deal of investment in research and development. Much of it will be borne by the private sector because they see opportunities abounding. However, many are fairly high risk because they are novel technologies: technologies that will take a fair amount of effort to gain acceptance into the market place. There are, as in any new products, wrinkles to be ironed out in the process and a lot of basic research is required. I would say that there is a significant role for government to play in promoting the development of these technologies.

Zane Shah:
Group manager of the Standards Division of the Canadian Standards Association.

There is still the impression that codes and standards are written solely as instruments of regulatory control. In the Canadian Standards Association (C.S.A.), this is far from true. Standards and codes are written as instruments of technical change or transfer of technology from research to the market place, for the development of new products. Various C.S.A. technical committees are often the focus of sectors of industry or dynamic organizations which, in many cases, have very tight deadlines to meet. For example, C.S.A. arranged a workshop where four members of our technical committees outlined their thoughts on, and the developments of, products up to the year 2001. They were Malcolm Lodge from the Institute of Men and Resources, in P.E.I., who discussed the development of wind-energy up to 2001, and the products that would be required to exploit it. There was Frank Hooper from the University of Toronto who spoke on solar energy and its development; Skip Hayden from the Community of Combustion and Research Laboratories who spoke about developments and improvements in home heating systems, and new products that are coming on the market; and Robin Hayden from Energy, Mines and Resources who spoke about the Ener-Guide program developed by Consumer and Corporate Affairs.

Beginning with wind energy, studies have shown that conditions across Canada are very favourable for the development of wind energy. Aero-generators or windmills, or wind-energy conversion systems are not new to the country. In fact, they have been used over 50 years in one form or another to pump water or generate electricity. To incorporate these systems effectively into the energy grid, and to provide a firm base for the design, construction and operation of aero-generators, it was necessary to set up a C.S.A. technical committee to provide standards. The committee will begin by standardizing terminology. For instance, I have used several terms: aero-generators, windmills and wind-energy conversion systems.

It will go on to study: wind and storm loads imposed on these systems; the stability and safety of the structures; the siting of structures (for efficiency); materials employed in construction; the compatibility of electrical design with the rest of the electrical grid; and, last but not least, testing methods for rating the performance of manufactured goods. The schedule for the preparation of the standards is tight; and a deadline of mid-1982 has already been given. Once the standards have been established, it will be relatively easy for the new industry to expand, and for consumers to purchase and utilize products with confidence.

Frank Hooper outlined the significant role solar energy will play in residential housing. Once again, many mistakenly believe that Canada is not well suited to benefit from solar rays. But this is not the case. And, once again, in order to encourage and interest industry, funds have been provided by the federal government to set up a technical committee to prepare standards that will lay the groundwork for the industry. The committee was established three years ago and, within a period of one year produced a preliminary standard of solar collectors that covered their design, construction and performance.

Up to then, to say the least, the manufacture of solar collectors was haphazard. Little thought had been given to high, fluid temperatures on a hot summer day, or, to the compatibility of materials, or even to a design that would allow maintenance of these solar collectors.

Once the standard was developed, it still needed to be ratified in the field. The following year, under a federal grant, up to 24 solar collectors were purchased and tested according to the new requirements.

The result of these tests was that, once again, modifications were made to the standards. Today we are pleased to state that industry and consumers have a set of base standards they can look to with confidence. Standards, however, are not engraved in stone and will change with advancing knowledge and experience.

The same procedure will also be followed for the development of standards for solar domestic hot-water systems, and the preliminary standard (for this system) is expected by mid-1982.

Let us turn to more traditional fields, and study the manner in which changes are brought about (in products) through technical committee activities.

Electrical appliances used in households come to mind. For years, in the Canadian Electrical, Part 2, such appliances have been covered by C.S.A. safety standards and the manufacturers were required to conform to them. They were, however, not performance standards, and most manufacturers had little or no knowledge of how much energy was actually consumed by their products. A few years ago, Consumer and Corporate Affairs, Ottawa, decided to educate the public as to the energy consumed by various electrical appliances. The Ener-Guide program, which required that the energy consumption of all major household appliances, in kilowatt hours, per month, be prominently displayed on labels, was introduced. You may well have seen these Ener-Guide labels. To meet these requirements, test methods for determining energy consumption had to be drawn up, and the standards for electrical appliances had to be moved from the safety sector to total, overall performance standards.

To cope with the program, the C.S.A. steering committee on the performance of electrical projects was established, and work began on performance standards for refrigerators, freezers, washers, dryers, etc. So far, performance standards for six of these appliances have been completed and testing is well under way. The effect on the industry has been extraordinary: Successive testing of appliances against performance standards have shown design improvements have reduced energy consumption by almost 50. The Canadian Electrical Association has estimated the savings to Canada in the billions of dollars. The program is well supported by industry, and work is now underway on performance standards for motors, lighting, heat pumps, etc. The solid fuel-burning industry has already moved into the second generation of such appliances and will need standards to control the manufacture and application.

At an open C.S.A. meeting early this year to determine what action was needed for standards and support of energy conservation in housing, the response was rather startling. We went there with the intent of developing a traditional standard for products designed to improve energy conservation. However, what the people wanted was, a form of evaluation that would enable them to evaluate a house for energy consumption. It was pointed out that there are many claims being made about products that conserve energy but there is no national procedure for determining the real effect of those products. They also indicated that, based on an evaluation procedure, it might also be advisable to advocate labelling a house, exactly as you do in the Ener-Guide program.

To get the project on its way, C.S.A. retained a consultant, and we now have a report from the consultant on the evaluation and labelling of various energy conservation features of a house. This report is being put before the C.S.A. Steering Committee on Energy Conservation and Housing and it covers the evaluation procedures that already exist. But there are other procedures currently being developed by the National Bureau of Standards in the U.S. and in Canada. Work is also being done at the National Research Council (N.R.C.) and, as many of you are aware, in Saskatoon by the N.R.C. there.

The many variables affecting the energy performance of a house, combined with the difficulty of defining these, make it unrealistic to expect to be able to predict the annual energy consumption of a house with any degree of precision. Energy exchange resulting from such mechanisms as solar gain through windows, air infiltration and below-grade heat transfer, cannot be determined accurately and must be estimated. The effects of some potential energy-conserving features such as vestibules, heatilator-fireplaces, earth structures and solar spaces are all uncertain and will be very difficult to evaluate in any meaningful way, in the light of current knowledge.

For these reasons, concern has been voiced by some, over the implications of attempting to label a house with a single fuel consumption figure. As an alternative, a range of values or numerical index which would provide a relative rating of the energy efficiency of different houses has been suggested. These approaches and related concerns are dealt with in the report, and need careful consideration by the steering committee. Despite the complexities of the proposed labelling, there is little doubt that the committee can perform a most useful service in at least one area — that of establishing a standard procedure for computing the annual space-heating requirements of a house. This forms one of the main recommendations of the report and could well be the first objective of the committee, regardless of the type of labelling system that might eventually be adopted.

The steering committee had its first meeting last month and hope to produce the procedure by early 1982 so that we can clarify it under the super-CHIP program being developed by E.M.R.

Bruce Dodd:
Program Manager, Specifications and Standards Division of the Canadian General Standards Board.

I would like to outline for you some of the activities of the Canadian General Standards Board in the general field of energy management products. Historically, our principle mission has always been the development of standards both voluntary and consensus standards. More recently, however, we have been backing up some of our standards with certification programs so that users of products and services can be assured that they meet the requirements of pertinent standards.

Most of C.G.S.B.'s work in this field concentrates on the components and materials that make up the building envelope, the barrier (between inside and outside), and the weather, good and bad. Several areas of this activity deal with the quality of materials directly relevant to energy management; that is, the materials concerned are intended to keep heat where it belongs — within the building envelope. These are thermal insulation materials of many kinds, a wide range of caulking and ceiling materials for a variety of purposes and climates, thermally performing glass, storm windows and doors and others.

A number of other standards establish quality and performance requirements for materials that are relevant to energy management (more or less indirectly) if it involves controlling the migration of moisture into and through the building envelope. As an example, there are roofing, water-proofing and damp-proofing materials and systems, masonry water-repellents, building-papers, vapour barriers, specialized paint, and so on. You don't see standards on news stands along with Macleans and Time because they're a bit like stage scenery — they do the job quietly in the background. Nevertheless, they're essential.

Standards are not secret documents. On the contrary, they are public but they do, as the hymn book says, move in mysterious ways, their wonders to perform. Energy management materials standards crop up in a number of places, working, you might say, behind the scenes. You will find references to them in the National Building Code of Canada and in various provincial building codes, as well as in CMHC residential standards. Many form the basis for CMHC materials evaluation reports and acceptance numbers. In many cases, they may be criteria for acceptance under provincial energy conservation programs. They often not only require that certain information appear on product labelling, as a guide to the user, but are themselves referenced on the label.

Now, to get back to standards for the quality of materials, let me focus on a single product that's typical of many: loose-filled cellulose fibre, thermal insulation. It's not particularly new, but it has changed over the years, directly as a result of standards work. It's made by putting fire-retardant chemicals into ground-up newspapers. But, unlike last week's newspaper, this product is far from out-of-date. Like most, this standard nails down the areas of concern perceived by the committee that developed it. Those areas are: safety, durability, consumer protection and quality control. To back up the standard, the C.G.S.B. offers a certification program to manufacturers of cellulose fibre insulation, to ensure that the manufacturer is consistent and correct. I should also mention that there is some degree of overlap with The Hazardous Products Act which also contains certain regulations for safety, durability and consumer protection.

Among safety requirements, are those for surface-burning characteristics expressed as flame-spread classification. There are requirements for resistance to smoldering and corrosiveness, so that chemicals in the material will not attack trust plates, venting pipes and wiring. There must also be resistance to fungal growth. As for durability, there is a requirement for flame-spread permanency to ensure that the fire-retardant chemicals don't disappear in a few years, leaving the homeowner with an unsuspected fire hazard.

In the area of consumer protection, the standard requires that the material have a minimum thermal resistance-value and that a table of insulation value, thickness and coverage be put on the labels of bags containing the insulation. That table is derived from the test results themselves. In addition, no objectionable odours are permitted lest they permeate the house. The standard sets limits for density and thermal resistance and the table on the bag must be accurate.

In some respects, this standard is more demanding than the Hazardous Products Act which, for example, does not require resistance to fungal growth or specify thermal resistance, lack of odour or consistency. In this sense, many standards are more demanding than the pertinent legislation.

In the certification program for manufacturers of this type of insulation, the manufacturer first submits a sample to an approved laboratory and sends the test results to C.G.S.B. At the same time, there is an independent assessment of the manufacturer's quality control system to ensure that it is within the required limits and on a continuing basis. At this point, the manufacturer makes an application to participate in the program, and undertakes to abide by its terms and conditions and agrees to continue to do so. The engineering and lab reports are then reviewed by a national certification panel, to determine that both meet the requirements. Assuming that all is well, the manufacturer is admitted to certification-listing by C.G.S.B.: He certifies compliance with the standard on every bag and he may use the C.G.S.B. logo in his advertising. The C.G.S.B. carries out periodic sample checks, referring defective material back to the manufacturer for correction. Failure to rectify defects or consistently non-compliant material, could result in suspension from the program and a withdrawal of permission to certify compliance or to use the logo on his bags.

Now, let's have a look at the other side of the coin: quality of workmanship. Under this broad heading come standards for the insulation and the application and selection of materials. By and large, these standards are used by architects, builders, engineers, draftsmen and spec writers. There is also a national certification program for residential insulation contractors, and that program is used by consumers and the CHIP program. If it is not used directly by consumers, it is certainly of immediate interest to them. Let's run through it and see how it works. I think you may be interested in knowing who develops these standards, what a committee consists of and what the interests are. You'll notice it's set up so no particular interest group is likely to dominate the others — you will find insulation contractors, manufacturers, consumer representatives, federal and provincial government representatives, construction associations, a utility rep and one or two technical colleges. In short, there's a cross-section of everybody with an interest in the subject and, in this sense, it is typical of all committees that develop C.G.S.B. standards. And, to be fair, C.S.A. standards too.

Now, what forms the basis of the insulation contractors' certification program: First, obviously, is the certification standard which lays out requirements for certification. Second, is the handbook on insulating homes for energy conservation — the bible on home-insulation. In addition, there are product insulation manuals, particularly for products that require special equipment or special installation techniques. (as a matter of interest, the first editions of these documents were all developed in the six-month, crash program which had two results: one was the documents; and the other, quite a number of gray hairs.

The essence of the C.G.S.B. program is, of course, compliance with certification standards. Okay, what does that mean? First, there must be an authorized business entity (in the sense of a registered entity, not necessarily a limited liability company). Second, there must be compliance with labour, business and consumer protection laws, plus community by-laws and practices. Third, liability insurance is required. On top of that, contracts must be written and must contain details of the work that will be performed. Business records must be accurate so, if a bad batch of insulation is discovered, the homes in which it was installed can be traced and corrected. There must be a written warranty and it must be embodied in the contract. There must be an internal quality audit and a system of recording and resolving customer complaints. (These can take a number of forms, counting bags, for example, so the consumer knows he's getting what he paid for. There must be a preventive maintenance program for all equipment and, of course, the contractor must use materials that meet Canadian standards.

The bulk of the certification standard, however, deals with personnel requirements, and outlines both the knowledge and the practical ability that must be possessed by senior estimators (a term we use for those who have the final responsibility for work content and for the installers in charge), and employees in charge of a work crew, who are present at the job site. Well, that's the essence.

Now I'm going to outline the procedure for contractor certification. It will seem a bit familiar, because it's very similar to the manufacturers' program. But this time, it is the contractor who registers with C.G.S.B. And, instead of material tests, we have key personnel passing C.G.S.B. exams. The exams reflect knowledge requirements contained in the certification standards, and are based on the insulation handbook and installation manuals I mentioned before. (These books were produced specifically to help people pass those exams and are essentially text books.) The contractor must show that he complies with business requirements, as I mentioned. Just like the manufacturer, his next step is to apply and to agree that he will continue to comply. As before, he must provide evidence of compliance, and that evidence is reviewed by a certification panel — one of several regional panels. (Volume and the difference in the regions of Canada, make a national panel impossible.) Certification listing is also parallel, except that, the contractor certifies his compliance on every contract rather than on every bag. Here again, C.G.S.B. inspects random samples of a contractor's work done and is prepared to de-list any contractor who fails to comply with the certification standard.

The contractor certification program is up and running — the people in our qualifications and certification branch are putting on an excellent imitation of a one-armed paper-hanger. The Canadian Home Insulation

Program now requires residential (insulation) contractors to participate in the C.G.S.B. program if customers are to receive CHIP grants. The C.G.S.B. list of contractors may be identified by its noble logo which, unfortunately is not in glowing technicolour, but should be red. You'll find that logo on contracts and advertising. And key personnel (not necessarily salesmen), are provided with wallet cards.

THE AIR CHANGER
COMPANY LTD.
ALLEN-DRERUP-WHIT
NGER

Section E

SELLING CONSERVATION

14 Marketing Energy Conservation

Dr. Gordon McDougall:
Professor at the School of Business Administration of Wilfrid Laurier University, Waterloo, Ontario, Dr. McDougall has conducted a number of studies in the field of consumer behaviour and energy conservation. He is co-editor of "Consumers and Energy Conservation": Praeger Publishers.

What I'd like to talk to you about is first of all, one particular study that we did with respect to actual consumption of energy and what we did to start with is to just basically have a look at the problem and putting it out in very simple detail. How do we get people to adopt conservation behaviour? We lined up, at that point of time, four basic obstacles as to why people might not conserve energy. First of all, they don't understand energy because it's an indirect use. It's not like buying an appliance, it's not like buying an automobile. They don't think about energy persay.

Second, in Canada, up until 1981, the real price of energy has been declining and in particular, if you have a look at it relative to the consumer price index, it has not been a substantially higher or lower factor.

The third thing is that we don't know if traditional marketing strategy, that is if we can pump energy conservation the way we pump anything else in the market place, will work because essentially we are trying to get them to use less so it's really not clear whether we can use it. Finally, there's this notion of the ability and commitment of government departments and that is, at times, they've talked a good line but their actions have been somewhat less. The fact that the real price of energy has been low for a number of years in Canada is an example of sort of the commitment of government departments.

One study was conducted for Consumer and Corporate Affairs. We went out and we surveyed about 3,000 Canadians and we went back to the utilities and got actual consumption data. We got the actual consumption data and then we collected a whole host of variables on these people so we ended up with a gigantic data set. The objective behind all this exercise is to see if we can understand what causes energy consumption in the home and the automobile. Another important factor with respect to this is how important are attitudes and you start off with the notion that positive attitudes should lead to conservation actions. So that's one of the things that we were thinking about when we did this study. So we got a whole host of variables so then we say, well can we explain energy consumption?

We used regression analysis where the dependent variable or what we are trying to explain is variations in energy consumption across Canadian households. And then we used a number of variables like degree days, how cold it is outside, where you live in Canada, the size of your home, some other characteristics about the home, some demographic variables like family income, family size, age of the heads of households and then some attitudinal variables. We used eight variables; eight for the male head of household; eight for the female head of household. Then we said, okay, let's see if we can understand which of these variables are significant related to consumption, the hope being in part that attitudes would be related to consumption. Well, it turns out, the measures that are significantly related are things like degree days, the size of your house, family income, family size. Attitudes did not help at all in explaining consumption.

I'll just highlight that. When you have a look at in-home consumption with respect to what we did, of the eight attitudinal variables of the male, of the eight attitudinal variables of the female, nothing counts in terms of explaining consumption so the question is why? A number of answers, maybe the simplest one is that Canadians, by and large, talk a good line but don't act the way they talk so that when we go out and ask people, "Are you in favour of conservation?" Everybody's in favour of it but very few people are doing anything about it.

We went through this and then we said, well, maybe we can get a better feel for this if we have a look at sort of variations in consumption and we'll line up and have a look at in-home consumption and automobile consumption and split the people into a number of categories to see if we can get a feeling for how lifestyles affect all this stuff.

If you have a look at income, age, etc., etc., it gives you a feel of what is going on in terms of these characteristics that influence consumption. I think a couple of the noteworthy ones are the number of cylinders averages 11; in other words, the average Canadian family has more than one car. They have 11 cylinders. The number of rooms average 7.4. On the other hand, if you have a look at the roadrunners, these are the people that are always on the road and use very little in their home, what you find is they tend to be younger, live in smaller homes but one of the main reasons why they are roadrunners is that they are commuting all the time. They are very heavy commuters. That's a significant factor in the roadrunner. They also tend to have a few more cylinders than the average household as well. So what you start to do is to get a feel for what is going on and then one of the other things we found out when we were doing this is that people who use a lot of energy in the home do not necessarily use a lot of energy on the road. In fact the association between how much energy you use in the home and how much you use on the road is very low which is a really surprising thing. It's got sort of some interesting implications for marketing. Let me just go to the "church mice". And we call them church mice for a particular reason and that is their consumption is 36 below the average. There's a reason for that and that is they are low consumers because of income constraints and what we've found through this exercise is that very few people it appears are conserving by saying, 'I feel like doing it.' They are forced to by economic circumstances.

Now, hippos consume five times as much energy as church mice do so there's a tremendous difference between the two. I think it's pretty obvious why the church mice are the church mice. So these are the people we are impacting with higher energy prices and as the energy prices go higher more people will move into the church mouse category. In contrast, the last category is the hippos and these people consume 84 above the average in terms of energy consumption.

The other thing we learned through this exercise is, while income is a factor with respect to energy consumption, it's how people use that income. In other words, it's not a simple formula of saying, well they've got more income, they'll consume more. It's how they spend that income and Canadians tend to spend it on an energy intensive lifestyle.

You get a study out like this and you say, well, what are some of the implications of the thing? We've got four routes that we can go with conservation. We can go a voluntary route or a mandatory route and I don't think we'll ever go a mandatory route until times get really tough. Basically we're talking about voluntary route. We can either use non financial or financial kinds of options out there and as I see it, most of the programs so far in Canada have been by and large of a financial nature. There is the energized program. There are some home-auto programs but the biggies out there are things like CHIP and so on.

We can take these conservation options and we can have them impact on consumers in two ways. I think a lot of people don't appreciate the sublety. We can impact on people to have a minimum change in their lifestyle and that's basically getting them to use energy more efficiently. Or, you can ask for a maximum change in lifestyle. That is to have everybody use less, not more efficiently, but just use less. Unfortunately, many of the programs that we started off with here in Canada were directed at this maximum change in lifestyle. That is, have people use less. Use less, it will make you feel better, didn't make anybody feel better and they just continued to go on using it. I think you can see now that most people are moving in with the programs that cause a minimum change in lifestyle. It can be done and the potential is 30 — 40 percent if we put a little investment into the home.

Just to give you an example of how you might consider this, if you look at the consumer, added efficiency can occur in two manners: through investment, that is, adding insulation to the home and making the home airtight; or operating decisions, that is having the furnace checked and cleaned once a year, sort of like the maintenance of a car.

Home audit programs offer a lot of potential. They provide information for consumers, and they target an efficiency area. What this basically says in the little message I'm trying to get across, is that you can generate a considerable number of strategic options with respect to something like home audits. You've got your promotion component and all I've done is arrange them from low involvement to high involvement, publicity speeches being on the low side up to direct mail, telephone or thermography programs which are sort of high impact sort of programs in terms of promotion. B.C. Hydro and the Ontario government have both used therography programs. You have a tremendous amount of people who come in to look at the little films. They don't know what happens after that however and that's the unfortunate part.

I guess the bottom line is you have a real need to understand consumer behavior and I hope the study I gave gives one example of the kind of work that you might want to do or have a look at before you go in and start marketing energy conservation programs. Secondly, you want to understand the kind of consumer decision-making that is involved with respect to energy conservation or energy services. When you're moving into a marketing program, first of all you should use segmentation strategies. If I could have one criticism of many of the programs out there, it is that they just sort of cover the waterfront and they appeal to very few people in the end because they're trying to appeal to everybody. Use segmentation strategies and you learn something new at every conference. Here, I learned the basic prime market for people with respect to home audits and insulation is those people who are renovating their homes. That's a clear-cut segment in there because it's very efficient in the end for them to do insulating in addition to doing the renovations. A couple of other notions you might consider are benefit segmentation and demographics. Once you've done your segmentation exercises it's a matter of taking something like these tactical options and lining them up with respect to the particular segment.

Sandra Rennie:

Vice President of Applied Energy Services, Inc., a new company involved in the marketing of innovative energy delivery systems to reduce the cost of energy services for major energy users. Ms. Rennie heads the commercial buildings operations of the company. The company is based at Arlington, Virginia.

I was for a time a Senior Executive of the U.S. Dept. of Energy, so I have been in the research community in the non-profit and private sector completely and in the government sector as well.I feel like I've circled this issue of consumer behavior for the last several years looking at it from a variety of perspectives at least, fairly comprehensively, in the geographic area of the U.S. As I came into town last night from the airport after dark, I was reminded that Canada is not in the same situation that the U.S. is at this moment in time. What reminded me was the marvellous skyline with all of your highrise buildings in Toronto almost entirely lighted up. You don't see that very often in the U.S. any more and I must say it was esthetically beautiful. That's relevant to some of the things that I'm going to say about consumer behavior and energy consumption.

The marketing of energy conservation is not a soap flakes issue. When I say soap flakes I mean that housewives, for example, understand what soapflakes are for. They know where to get it, how to use it and have expectations about what it's going to do for them. Basically, the choice they make is the choice among brands, a choice among alternatives . . . the brand or type which will give the best result. The housewife already knows and has decided that she needs some sort of soapflakes. Energy consumption and energy conservation is not that kind of an issue at all and I think that has fundamentally important differences for the way conservation has to be marketed.

Since about 1977, the Energy Productivity Center at the Mellon Institute has been performing research and conducting commercial type demonstrations aimed at understanding the patterns of energy consumption in the U.S. This has included quite a bit of work on consumer motivation and building energy consumption. In the U.S. principally through the U.S. Dept. of Energy's arm called the Energy Information Administration, we have a lot of data, good data, on energy consumption. We have a pretty good idea in the U.S. who's consuming what. We can break it down demographically. However, the emphasis at the Energy Productivity Center has not been to understand who's consuming what, but rather to understand why consumers are behaving the way they are and to begin to understand how to motivate consumers to do something which they haven't done on their own.

There are really several categories of behavior and I have terms for them since this is a relatively new field. The first kind I would call 'direct consumption behavior' including actions which are technically easy to execute, like lowering the temperature setting on a hot water heater for example. Then there are those requiring continued action like turning out lights every time you leave the room, and there are those typically without cost or with a very low cost. Those include cutting back and doing without, lowering the temperature on the hot water heater, turning off lights when you leave the room and actions typically costing almost nothing.

The second type of consumer behavior on which I want to focus is consumer investment behavior which was termed efficiency behavior, the kind that really gets to the heart of the matter. When is the consumer willing to put his money where his mouth and attitude surveys have been? I want to concentrate on investment behavior because it's more difficult to motivate consumers to invest and because investment often leads to more permanent and I think, therefore, more desirable conservation. I guess the most important thing I have to say is that consumers are a whole lot smarter than we've given them credit for. When they perceive risks, they hesitate to act.

At the Energy Productivity Center we've tried to cast ourselves in the role of observers instead of manipulators of energy consumers and tried to understand what motivates them and we were sort of startled, because in my opinion, major decisions, for example, with large government programs in the U.S. have been based on the flimsiest of research, really a small number of public opinion polls of limited scope and, most importantly, the assumptions on which many of those decisions and programs were based seemed to be erroneous.

Our own theories have not been thoroughly tested. Many of these theories are about to be subjected to field testing, however, in a commercial demonstration of something called the House Doctor Delivery System in Lakewood, N.J. This will be on 1,000 houses. We'll be monitoring and evaluating this project through the Mellon Institute.

First, and essential to understanding everything else about energy consumption in homes, is that it is dollar savings which matter to consumers, not B.T.U's. I may be interested in energy and so may you, but it's the energy bill the consumer is interested in. That's why I said Canada is not in the situation the U.S. has been in in the last few years because you are just now embarking on a period which will see energy prices increasing dramatically for consumers in residences.

Secondly, the consumer is concerned about comfort . . . being too cold or too hot is decidedly unpleasant and uncomfortable. After the basic shelter need has been filled, maintaining an acceptable standard of comfort is probably the second most important goal of the homeowner.

That, obviously, comfort and conveniences wrapped within the definition of comfort is a much broader thing than energy, but energy is an important part of it, perhaps extremely important because it's been taken for granted. People haven't thought very much about whether they have to be colder than they want to be during the winter in their homes up until now. This is also why direct consumption behavior changes are more likely to be cutting back and doing without changes. As such, they represent a loss of comfort, a loss of convenience, a lower standard of living, and therefore, they should be viewed as temporary by energy policy analysts. They contain an element of sacrifice and people will sacrifice to get through a crisis but who can expect them to voluntarily sacrifice indefinitely.

What else does an energy consumer expect will affect his investment decision? We've observed two additional factors. The first of these is control. He wants to be in control of the situation. This factor I think, is unique in its intensity with housing because a home is so many things to the person who lives in it. It's shelter, it's a place of respite, it's the focus of most people's biggest single investment. The need to be in control in his home means that he needs to understand not only what energy improvements to make, but why he ought to make those improvements and what his choices are for getting them done.

The fourth factor is quality control. If the reasons for making energy improvements are to save money and to maintain comfort or perhaps to improve comfort, the consumer needs to know that his goals have been met and, if they aren't, that he has some recourse.

We've concluded that to meet his needs, the consumer requires three things. He requires information, choices for action, and reinforcement after he's taken action. Before I elaborate a little bit on these three, I'd like to tell you something about our observations about the consumer decision-making process. Not all consumers behave the same way. You just heard some interesting data which is confirmed in the U.S. also, that consumers behave differently in their automobiles than they behave in their homes. Not all behave the same way, they don't all behave what we might think of as consistently. Frankly, I've come to the conclusion that it's not inconsistent, I think it's just a matter of different lifestyle. They don't all have the same criteria for making decisions, but they do have certain decision-making processes in common.

Because energy has been inexpensive in Canada and the U.S., there has been little need for consumers to understand energy consumption. Many of them probably don't know how to cut consumption even if they're motivated, nor do they know how to evaluate their alternatives. They're unfamiliar with the whole subject. Frankly in the U.S. the alternatives have been very skimpy and sometimes evaluating those alternatives involves spending a terrific amount of time and money or taking a risk that the project won't perform as hoped. The consumer has to think and decide about questions with which he has little or no experience. Many behavioral scientists refer to this process as unstructured decision making. It's not specific to energy. It's general. It's the way you and I deal with a problem where the subject matter is simply not familiar to us. We go through a hierarchy of steps, rather precisely, the first of these is the perception of either a problem or an opportunity. For example, rising fuel bills may force consumers to seek new opportunities to save money. The second step is to generate information. Consumers seek information on actions to save money and they also seek criteria to evaluate them. These criteria are very important because if they aren't clear in their minds how to make decisions, they are going to have problems proceed-ing through the process of making a decision. The third step is the ranking of the criteria. This is a terrific rationalization process but however it comes out it's an important part of the process and has to be done, unless a consumer is willing to accept somebody else's criteria. Usually the number of criteria are limited, three or four maximum. The fourth step is to select alternatives. Consumers try to find an alternative that meets nearly all or all of the criteria that he has selected. If this can't be done or if a choice is not fair at all, that is there are no alternatives to consider, the decision will not be made until new criteria or information are developed. The fifth step in the process is implementation. That's when the consumer acts on the selection of alternatives and actually goes out and hires somebody to do something or goes out and buys materials and does it himself. The sixth and last step is resolution, simple feed-back that confirms that a proper decision was really made. Applying this process in this understanding, has important implications for both the public and private sectors in making decisions about energy programs and energy projects and marketing.

First, information is needed, not just any information but credible information that is believable by the way it's presented and comes from a credible organization.

In the U.S. generally, we've made some dreadful mistakes, I think. We've concentrated first and by we, I mean mostly the Federal Government, on telling people what to do before they really perceived a problem. We should have been telling them why they ought to be considering doing anything and instead we gave them a prescription of the things that they ought to do. We failed to encourage the innovators. We failed to publicize the innovators' successes. The result has been confusion and inaction and resentment.

The second thing that's needed is choices for action. The psychological need to be in control really requires that the consumer have these choices or he will create the needed choice by taking a no-action option. Doing nothing after all is usually a pretty safe thing to do, at least in the short term. Again in the U.S. we've made mistakes. The choices offered the consumer are typically pretty slim; perhaps a standardized computer audit from a utility and a contractor who sells either insulation or storm windows. The information on the U.S. tax credits confirms that people have made less than optimal investment by far, and have tended to invest in the things most readily available, that is insulation and storm windows whether or not those were the most appropriate things to do in their house. That is, they were not connected with the information that came from an audit.

Most importantly, these things that have happened in the U.S. are really only partial options; the procurement of an audit, either free or paid for, or going after insulation or storm windows. It's just simply not all that needs to be done and in many cases it's not the first set of things that ought to be done. The audit is but not the insulation and storm windows. Neither do they meet other requirements of the consumer, a means to make low cost as well as high cost improvements. They don't address a source of finance and they don't address a source of quality control. The consumer needs to be reinforced. He needs to know he's met his goal, he needs to know he's actually saved money and that's not always easy. Utility bills are very confusing in their presentation and they tend to mask his expected savings even more as prices increase on the utility bill.

I think that consumers are starting to take action. There is evidence of that although it's well below what's justified by cost-benefit analysis. Consumer behavior can be extremely volatile. It can change overnight. We've seen it in the U.S. with purchase of smaller, more fuel-efficient automobiles. I suggest to you that that could happen in both the residential and commercial building sector. In concluding, I'd like to just remind you once again of my opening statement. That is that consumers are a whole lot smarter than we've given them credit for and the bottom line for them is preceded by a dollar sign.

Allan Gregg:

President of Decima Research Ltd. of Toronto, Mr. Gregg is an expert in research methodology and public opinion research. In 1980, together with Public Affairs International of Ottawa, he launched "The Decima Quarterly — Public Affairs Trends," the first longitudinal study of public opinion of its kind in Canada.

Marketing anything, assumes that you should know something about the underlying attitudes and motivation that will lead to the issue of choice. From an analyst's point of view, we found the motivational antecedents of conservation behavior and non-behavior are extremely complex. However, at the risk of appearing to be sidestepping that responsibility, let me say that the analyst's task in dealing with this subject matter is difficult. Our data suggests that the task of the marketer, selling energy conservation, will be doubly difficult. It will be difficult because marketers are used to selling products. Once the product is recognized and subsequently positively accepted, the key to success, normally, is simply a matter of intensifying the sales pitch. More sophisticated marketers have some experience in selling ideas. To this challenge, the marketer normally would attempt to find fertile public opinion and make his issue the issue. In other words, try to generate positive endorsements of an idea by aligning or associating that idea with an already accepted benefit. The case I'll venture to make today, is to suggest that neither of these two traditional marketing approaches in aggregate, is neither sufficiently salient enough to the consumer, nor of depth enough to the problem to meet the challenge of marketing energy conservation in the future.

We undertook our first study of conservation behavior over two years ago on behalf of the Federal Government. Our task in this study, while massive, was very straightforward. Simply put, it was to identify those motivational forces which act as barriers to accelerated conservation behavior. Basically, what we were asked to do was to find what value structures, what belief structures and what attitudes were most closely aligned with the willingness to accelerate conservation behavior at the individual level.

Through the use of a very in-depth research instrument, factor analysis and a technique called perceptual mapping, we were able to identify four attitudinal dimensions that were particularly salient in determining the reported level of conservation behavior. These included, first, viewing conservation as a mere duty. That is we found that this factor found a very strong association between reported conservation behavior and values association with responsibility. The more some of us are willing to accept obligation and responsibility as part of individual efforts, the more likely we were to report a willingness to accelerate conservation behavior.

The second dimension was a proactive versus passive response to the problems of involvement. That dimension was evident in the strong correlation between conservation behavior and activism and a more nebulous difficulty we have found associated with conservation behavior. That is a significant segment of the population found conserving difficult, hard to do. Those who accepted a proactive challenge for involvement with problems were more prone to take on the difficulty associated with conservation.

The third thing was the perception or acknowledgement of a growing problem. That dimension was not restricted solely to a concern centering on the energy situation but rather was found to be more global in nature manifesting itself in an anxiety and more importantly, sensitivity to the future and acknowledgement that changes had to come about as a consequence of this uncertainty.

The fourth dimension was unquestionably the most complex and that was the economic viability of conserving energy, given the socio-economic status and perceptions of the response. This dimension manifested itself throughout the data and was routed not only in achieved economic status but, more important, in the acknowledgement that standards of living including energy consumption patterns must change if the existing quality of life is to be maintained. This dimension was also interrelated with the belief that somehow saving energy brings with it certain costs, that is for many people, saving energy costs money, doesn't save money, because a significant portion of the population does not relate energy conservation to saving or actually using less energy. We find perceived economic constraints and opportunities influencing conservation behavior in diametrically opposite ways depending on the degree to which the individual associates conservation behavior with this notion of saving. Therefore, we found that the economic status and the perceptions of individuals vis a vis the saving involved with energy conservation working in basically four different ways. We found individuals who won't save energy because they think they can't afford to. It will cost them too much given their current socio-economic status. We also found individuals who saved because they believed they can afford to, it costs money and they've got enough. Finally, we found individuals who don't save because they belive they can afford not to save.

In addition to these four attitudinal dimensions, the study revealed that energy conservation was associated with certain negative consequences. In aggregate, these negatives were associated principally with one, lifestyle curtainment and, two, the questionable economics of conserving. More specifically, for a large segment of the population, we found cutting back on energy use was tantamount to cutting back on a lifestyle or the way one lives.

Also there was widespread cynicism regarding individual conservation efforts. Not that the individual efforts unto themselves weren't important but, by themselves, they would not amount to much because others would not similarly comply to the necessity of conserving.

Throughout all these findings, as important as these attitudinal dimensions, these motivaters were, ran a consistent theme. No matter how strong these attitudes appeared to be associated with conservation behaviour, behaviour itself was a much better predictor of reported future efforts. Those who already reported some conservation behaviour are consistently more prone to demonstrate a tendency to celebrate their conservation efforts and the heaviest conserver showed the most potential for future savings.

It was on this basis that we draw one of our major conclusions which have been replicated at least in part in other studies, namely that historic and current behaviour, not attitudes, were social demographic characteristics and are the best predictors of future behaviour. Basically, we found the more that one had a lifestyle associated with heavy consumption, the more resistant that individual will be to conserving energy in the future. It was on this basis that we concluded that energy conservation, as much as we always associated with a question of energy consumption, is really a question of lifestyle. It's this suggestion probably more than anything else, that makes me suggest that marketing energy conservation in the future will be a difficult endeavour. For unlike selling products or even ideas, selling energy conservation will require not simply a realignment of lifestyle values, but much more importantly, it will require a change in lifestyle behaviour.

Before I get specifically into the nature and approach of this marketing challenge, let me share with you some more recent findings than this two-year-old study which casts some illumination on this subject. We probed the same areas that we had probed in 1979 again and in more depth in March and September of 1980 and most recently in March of this year on behalf of the Ontario Government. Again our task was to monitor changes of conservation behaviour and equally to pinpoint any alteration and motivation accompanying these changes. The two studies conducted in 1980 substantiated and refined our 1979 conclusion. In fact, probably the most startling revelation in these two studies, was the absence of any change in the stability of our findings. Our aggregate measure of conservation behaviour, basically an additive index we constructed, measuring the reported participation in some 14-odd behaviours did not change at all in a year, no movement whatsoever. Equally, as we would expect, the reported levels of public participation in individual behaviours did not change. Sixteen percent reported participating in a car pool in both studies. Forty-one percent reported using less hot water in the first study and 42 percent in the second. Twenty-three percent reported using public transportation, 25 percent in the second and so on. In fact, within the bounds of allowable error, only two of the 14 measures changed at all in the period of a full year. Sixty-one percent reported driving less in the last six months which was down 5 percent from the previous study and 33 percent reported improving their home insulation, up 7 percent from six months earlier.

We went back into the field in March of this year, as I mentioned, to track these responses once more. Again, we found, within the bounds of statistical error, our aggregate measure of conservation behaviour had not changed at all, two years and no change. Given the fact that the federal and provincial governments have spent literally millions and millions of dollars promoting conservation, that news wasn't very heartening.

While it may sound a little self-indulgent, from a researcher's point of view, there was even more disheartening news in our March findings. For while aggregate conservation behaviour had not changed at all, many of the attitudes associated with conservation behaviour in our 1979 study had altered very significantly. In March of this year, virtually all Ontario believed conserving energy was important, it was a good thing to do from a personal perspective and in fact, it was the best way to meet our future energy needs. While these positive attitudes were increasing, perceptions of the conservation environment were deteriorating. The percentage perceiving the urgency to conserve now compared to six months ago, fell from 46 percent to 38 percent of the population and those suggesting that Ontario, in fact, was facing a supply problem, likewise fell from 38 percent to 24 percent of the population. Undaunted, we forged ahead and we proceeded to operationalize a hypothetical model of aggregate conservation behaviour. In this model, we posed the conservation behaviour could be the product, either in isolation, or in combination, of a number of things that included belief systems, including attitudes and values, experience, including demographic characteristics, lifestyles and consumption patterns, information including exposure to advertising and certain evaluated criteria of the energy situation including recognition of a supply problem, attitude toward price increases, the perceived efforts of others and so on. What we were trying to do was explain the variance display in our aggregate measure of conservation behaviour on the basis of the independent effect of all the questions embodied in this big model we made.

To make a long and painful story short, no single factor in our model explained more than 15 percent of the aggregate variance displayed on our conservation behaviour index. In layman's terms, our model didn't work. None of the variables we were investigating proved to have much explanatory power as to why some people scored high on our aggregate measure and others scored low. The only other discernable difference we noted in our 1981 study was that the percentage of people who were volunteering that a particular conservation behaviour did not apply to them had increased dramatically in 11 of 14 of the individual behaviours we were investigating. Also, unlike other studies, we asked the respondents in this most recent survey, to provide volunteer and verbatum reasons for why they were or were not participating in each behaviour.

In desperation, and on the basis of these last mentioned yet unexplained findings, we went back to these openedended volunteered reasons for specific conservation and non-conservation behaviour.

An analysis of these much more qualitative results yielded some new insight. First, we noted that a number of people who were reporting non-participation, had literally, genuinely, no reason to comply. People who said they weren't using public transportation because they walked to work or hadn't had their furnace modified because they just switched to wood and so on. In short, these people were not 'not conserving' because they were not consuming. The obvious conclusion from this finding was that the actual number of individuals who were deliberately not conserving for many activities was significantly lower than any earlier studies had suggested. The second finding flowing from these volunteered responses was that there was a significant proportion of the population claiming they were not participating in selected behaviours because they believe they had already complied. That is, their circumstances suggested at least to them, that there was no further need for compliance. They had done enough of that behaviour, thank you, and they had modified their behaviour sufficiently enough. The third thing we noted was, notwithstanding these two above findings, there still existed a significant percentage of the population who were not conserving because they were clearly resistent to or saw no need to conserve. Related to all these three findings then, was an additional trend — that specific behaviours of these 14 received a disproportionate share of usually only one of these reasons for non-participation, that is, once you remove from the sample those who genuinely could not be expected to conserve, you had a number of behaviours for which nearly the entire population engaged; almost everyone, servicing their furnace, lowering the thermostat, tuning up their car, driving less. Reasons for non-participation because of perceived compliance were cited overwhelmingly for those behaviours which had medium levels of participation; driving slower, checking stripping and insulation, improving stripping and insulation and using less hot water. Finally, hard attitudinal behaviour resistance to conservation activity appeared to be restricted almost exclusively to those behaviours in which very few of the public engage, using public transportation, conserving energy at work, participating in a car pool and modifying the furnace.

What all this suggests to us was that we were unable to find strong attitudinal motivation to aggregate conservation behaviour because conservation behaviour is not an aggregate activity. Some people participate in some activities and not in others and the reason, the motivation if you will, to participate or not to participate, can vary, not so much by individuals, but by the activity itself.

We ran our regression model but this time, using each of the 14 selected activities rather than the aggregate index we created and, lo and behold, it worked. Our hypothesis was borne out. Motivation is selective based on the activity. We found high participation behaviour are only very loosely rooted in attitudinal motivation. Rather these activities again of servicing the furnace, lowering the thermostat, tuning the car and driving less are now routinely practiced by a large majority of the population and are practiced for reasons of routine. In effect, the behaviour or the act itself has become part of the public lifestyle. The medium participation behaviour, driving slower, checking insulation, improving stripping, using less water and improving insulation are all principally associated with the perceived importance of the behaviour. That is, what that behaviour will do in the larger scheme of things and the perception of the individual's effort in relation to others, what they in themselves have done in relation to the rest of the population.

In fact, there's the overall level of participation declines for these medium behaviours, the perceptions of the individuals efforts to cut back became more strongly associated with participation than the perceived importance of the activity. This finding therefore was very much in keeping with an earlier finding which revealed that a large segment of the population's reasons for non-participation in this behaviour is believed compliance. That is, perceptions of the individuals efforts have a strong bearing on participation, for these behaviours because so many individuals view their own past efforts as reasons for not accelerating their behaviour.

Finally, we found that no single factor or predominant set of motivators explains low participation behaviour. Rather, these rarely practiced behaviours are each performed for various reasons of lifestyle and attitudes individually. The number of vehicles owned and the value placed on the automobile are very strongly associated with using public transit. The perceived importance of conserving at work and the perceived importance of carpooling are strongly related to their performance although age is strongly related to participating in a carpool, and so on. Each of these low participation behaviours had their own motivation.

What does this all tell us, then, finally about marketing energy conservation in the future. First, it tells us that any attempt to sell conservation must be targeted and not shotgun. Also it must not be targeted just based on the segments of the market but on the conservation activity that you wish to engender. Individual efforts must be isolated and individual motivations must be offered. Secondly, it tells us that motivations, where appropriate, must be directed at lifestyle enhancement, both individual and social and not lifestyle curtainment. And thirdly, and most importantly, it tells us that mass media communication or persuasion, no matter how specific, unto themselves, in isolation, will not be enough to engender accelerated rates of energy conservation. While a positive attitudinal environment to the necessary prerequisite of behavioural change, the key must be to actually to get people to change their behaviour.

In short, conservation must be experienced before it can be sold. For this reason, it seems clear to me at least, that the key to marketing conservation in the future will not simply be a public sales job but also and more importantly, a private sales job for if the public is to experience conservation before it will be bought, then it is encumbent on government and the private sector to begin initiating that experience through their programs and products.

Ed Kulperger:

Planning Superintendent of the Energy Conservation Department of Ontario Hydro, Mr. Kulperger has been involved with the energy industry in Ontario for many years. Ontario Hydro has implemented an energy conservation program for the province which includes the initiation of building market support for low energy housing and energy auditing.

Before you can market anything, you really have to set yourself some goals and the marketing goals that Ontario Hydro's marketing function has delineated are three: first is to eliminate waste. The second is to encourage the efficient uses of electricity in all markets — residential, commercial and industrial and the third is somewhat allied to the whole thrust of the Ontario economy and what's happening and that is to support the provincial program of electrification.

At first these goals may not seem compatible however, if you look at the supply/demand picture in Ontario, which our grass roots marketers have to do, electrification takes on a new and positive perspective. In Ontario, 50 percent of the energy comes from Alberta. 23 percent is generated within an indigenous resource, basically hydraulic or flying water resources and some nuclear. A lot of the energy within the province comes from the U.S., and that's mainly Pennsylvania coal, for thermo-generating stations. If you look at that the province and Ontario Hydro are trying to maintain and enhance the quality of life in Ontario at a time, and this is an anomaly, when our economic base is under attack.

We now import from outside the province, 77 percent of our primary energy resources. A large percentage of this is oil and gas. This represents a serious drain on our economy. Every year, approximately 8.5 percent of our gross product leaves the province to purchase energy. In 1972, that was 2.5 percent. By 1983, it will likely be 10 percent. Over 40 percent of our energy needs are now satisfied with expensive imported oil. Consequently, we are seeing a dramatic push for substitution to try and slow down the flow of capital outside this province. Since electricity is indigenous and abundantly available, electrification will, as I mentioned before, be the future cornerstone of Ontario's economy. This is not our mandate or our dictum, it's a dictum of the government. Substitution coupled with reduced demand will increase our economic base and create new conservation industries.

How about the marketing environment? Marketing environment for any large organization, especially an energy supplier, is a very, very important thing to try and define because there's no point in doing attitude research or all kinds of studies to begin with if you have no credibility in the marketplace and I think you are seeing that right now with the oil companies and the Canadian Petroleum Association. They try to develop and disseminate message to the public but they are just not credible so they've got to do something about it.

We went ahead to try and find out the same thing and we went to Gallup and we went to Market Facts and Decima and we found out there is a favourable marketing environment for our efficient use of energy and substitution messages. Because of our profile, our customers have a high awareness level of Ontario Hydro as a provider of energy information, not electricity information, energy information. This indicates to us that our methods of reaching the public are fairly successful.

What about credibility? Coupled with this high level of credibility, the information we disseminate is perceived by the public as being very reliable. It's no use pushing out barrels and barrels and bombarding the public with all kinds of energy information if they don't think you are a very reliable source. You've got to be a reliable source. You've got to check that out. This confidence has gradually evolved over the years as Ontario Hydro has continued to endeavour to provide the public with well researched, unbiased information. There may be some pro-nuclear people that won't agree with me but I'm not involved with that part of the corporation. We simply, in the marketing function, put out energy information per se.

The third thing is reliability. Electricity is seen as the most reliable source of energy over the next 20 years and people also place a high importance on energy conservation. How about receptivity? Over 81 percent of the people surveyed felt that receiving information on energy conservation was important.

I would like now to talk about how you reach that target audience. First of all, you have to develop the motivational framework. You have to go through and isolate the very, very major variables involved in people conserving and saving money. Out of 1162 respondents, 77 percent said, 'I'll conserve as long as I save money.' There is, as some of the research points out, more and more altruism but still the basic driving force behind conserving energy is saving money. It is evident this benefit of wise-use should therefore be stressed in all our endeavours to reach our audience. As prices continue to escalate between now and 1986, saving money will continue to be a very important motivating factor.

Consequently, in addition to our regulation communications program, we have been trying to set up a residential energy audit program or advisory program which we call REAP. This service will provide energy use surveys to our customers to help them make informed energy choices and save energy and money. It appears we are on the right track because once more we are trying to get out there and try to have people experience energy conservation techniques and get out there in their homes and have a hands-on approach. It's costly but we feel it's the only way that's really going to solve the problem.

After doing a lot of attitude researches over the years, we did something that we came up with a new title for. We acknowledged that with the advent of the consumer era, we have to take a different look at the marketplace and try to figure out really whether we were on the right track and whether or not the studies that we had done traditionally were valid. We came up with a new study which we call "Consumer Needs and Wants" study and it's simply a study to indicate whether all the information that you purveyed, that you've disseminated to the public, is really needed? And is it wanted? There's no use running advertisements, annual brochures, doing seminars, doing energy audits and all the items that energy suppliers get involved with if people don't really need it or want it. We found out that they do.

Home heating is an important piece of energy information in our end of the business; electrical appliances, water heating and home insulation . . . To really hit at those areas, we publish all kinds of booklets and pamphlets and brochures. There's plain talk about heating your home. We've found out that consumers in the 'needs and wants' studies, because of the off-oil substitution program the government has embarked on, want to know about all the various options for heating your home. Not just electricity but oil and gas as well. They want to know about heat pumps. What are the heat pumps? We now have a new heat pump booklet out. A poster that we hand out to consumers is called, "How you use the electricity you use" and it lists the average mean consumptions of all of the electrical appliances in the home and it gives the consumer a gauge of what the important energy consuming areas which respect to electrical appliances are. Some people want to read their meter. We came up with a booklet called "Worth Watching" where they can set up an energy log every month — read their meter and then they can do it daily and determine which of those appliances are using a lot of energy and could cut down on their consumptions. We are involved in builders' guidelines, energy efficient housing and also insulating your attic booklets.

Having gone through a lot of research vis a vis the types of messages in the electronic media that would be acceptable to the public, we have discarded gloom and doom messages. People do not want to be told things are getting bad. They've got enough bad news in the newspaper and in all walks of life. They want messages to be upbeat; they want to have some glimmer of hope in the future. The future is bright. They want to be stroked and the message has to be extremely positive or else they won't even look at it. Even if you think that the doom and gloom message is correct or relevant to what's happening in the marketplace, if it's not looked at, it's not acknowledged and it doesn't create a high awareness level, they won't look at it.

In addition to providing these kind of operational hints and tips, there seems to be a growing interest in Hydro's alternate energy programs especially in our low energy, passive solar home program where we have, across the province, provided builder support to build 40 low-energy homes. I know we did it later than Saskatchewan but we are finally getting on the band wagon. Seven different builders across the province produced homes which are a little larger to suit the marketing environment in this province

Jim Leach:
An architect in Denver, Colorado, Mr. Leach has worked extensively in the design of solar housing subdivisions.

I'd like to discuss work our architectural firm has done: I'll begin back in the mid-70's. We started with a 35 unit townhouse project that had active solar on it and was sponsored, in part, by our Department of Housing and Urban Development. We got a grant which provided about one third of the cost to the buyer of the solar systems. This is where we first started to learn about designing and building solar homes. These were townhouses, at that time selling in the $35,000 to $50,000 price range. We found that we got really good turnouts and a lot of excitement, even back in the mid-70's among that part of the public came out and looked at it. We got good publicity out of the trade journals. We got to be solar heroes.

When we really got down to selling houses, the houses sold very rapidly. When we analysed why they sold, they sold basically because it was a hot market. The solar turned out to be a factor that, if anything, would have been negative. You had to justify to the buyer why he had to pay this two-thirds of the cost of the solar system and we were able to do so successfully in the project.

Since then, in another portion of our Wonderland development, in Boulder, we have what I jokingly call our solar experimental farm. It's just a whole row of houses in this whole planned development, patio homes on 50' lots where we've tried just about everything you can think of in solar, ranging from very simple sun-temperate all the way to full-blown high-bred solar with 80 percent or more solar fractions. This particular project was another one that we received a federal grant for. Another was quite a sophisticated, complicated high-bred solar house with an active system that I'm not sure has ever worked. The house was relatively successful in the marketplace. And the reason wasn't because of the energy we were saving so much as it was the attractiveness of the way we were saving energy. Most of the rooms opened into the sun space. The house is very energy efficient. The bedrooms are on the lower level, living above, creating an exciting space that was perceived by the buyer as being very attractive, having a lot of lifestyle amenities — such as a hot tub and pool.

What we really learned from this home is that there's a lot more to it; as the famous Japanese philosopher, Datsun, says, in our car ads in Colorado, "There's a lot more to life than just gas mileage". Market value is really where it's at. Market value is in the eyes of the buyer, not in the eyes of the designer or the builder or the developer, and I think we often get confused and wrapped up in our enthusiasm for energy conservation and solar, and miss that point that we're trying to create very marketable products. It was to do with the sales effectiveness, of course, of the builder or developer, but more importantly it has to do with the product design itself, the execution of that design and how the buyer's going to perceive it.

I came up with this list of elements. There's nothing sacred about this except they're just what I could think up as reasons for how people perceive market value relative to energy conservation and solar in housing. Of course, there's just the economics, and in the United States we have some really significant tax credits; that's a good reason. Other reasons like aesthetics and lifestyle are harder to put your finger on but they're often the much more powerful ones. Future resale value has been very significant among the reason why people buy particular housing and I think it will continue to be that. They think that it's going up in value, it's a good investment and so forth. Of course there is prestige, pride of ownership, feeling you're the first one in your block in a solar house or being able to tell your friends that you heated the whole place for $100 last year, that sort of thing.

I want to describe for you, in some fairly expensive homes, some of these concepts. We have a patio home that has an exciting sun space in it. Another home that's similar is a semi-custom home with sun space in it, clear story windows that light the centre of the house and shed light back to the brick walls on the interior. Brick is a material that in our locale is quite popular. And I'm very much a believer that you have to design for the particulars of both the market segment and the location that you're in. In a really marketable solar design, the buyer will feel the solar is basically free. That's stepping out on a limb, I realize, but that's my feeling about how you design marketable solar housing. Good design is also, as I mentioned, attuned to the market segment.

I want to tell you of some lower priced houses that came out of a project. A project we did for a builder in the Denver area was done through a program that our solar energy research institute sponsored, similar to some of the things I think you're doing here in Canada. It was a demonstration kind of program. We took a model that they'd been building and selling for about $70,000, a very simple little detached cluster home, and did an adaptation for them on it, without shaking up their whole system. Basically we increased their sales price about $4,000 and we cut the energy use for space heating in half with some very simple things like sun tempering, putting quite a bit of glass on the south side of the house, opening up the house and making some exciting spaces. Where they had a regular, pre-fab fireplace we put in a brick face on it, and a few little things like that. We spent more money opening up the house in our basic energy conservation than we did on any of the things you can really call solar. The interesting thing about this example is that this builder really didn't have very many sites that really had very good orientation. This product, when he introduced it to the marketplace, became so popular that he started putting them on all his sites, and he had them facing south and east and west, which is not what we are advocating. But it is interesting in terms of the marketability factor.

Here is a more sophisticated market in the same price range, $60,000 to $70,000 townhouses in Boulder, Colorado. We're selling to young professionals, at today's interest rates. Very simple, straightforward, direct gauge. We're using water walls for the first time we've used a half-high water wall in order to get about 50 percent to 60 percent solar fractions in these. They're all sold. Fourteen units sold out very rapidly, yet we attribute that to really tuning in to the particular market that we're trying to address.

Another project is one that we did for the National Homebuilders' Association. They chose about ten builders from around the United States to do an energy saving house for the 80's. Our version for the Rocky Mountain area where we get lots of sunshine is a hybrid solar house with collectors that also double as skylights. Basically the active solar system is integrated with the passive and it also provides additional amenities in the form of skylights and exciting space to the house. We're really trying to address the marketability. Inside is a sun space, with the skylight collectors above, a lot of brick again on the inside. The back north wall with the sun space is a two storey space with some of the rooms looking down into it. Down in the lower level of the house, we took advantage of a concrete foundation and concrete floor that's normal practice in our area and put a brick covering on it, and we're using that as mass storage in our passive solar home. Getting double value again.

Another important thing that we're doing is to build a higher level of quality into the finishes of the house. If you're going to put all the quality into really tightening the house up and building it better and doing passive solar things, but if you can't reflect it in the finishes, it's just like if you built a Mercedes and didn't put the interior in it that they put in it. If you do it right, then they perceive it as being a Mercedes, and they'll pay more for it.

Here's how we're addressing the issues of the economics and tax credit things. We're comparing our house with a typical new home built to our present energy code and with a ten-year old home that we have information on from our local utility. Our concept here is to look at what are the buyer's choices in the marketplace and how is he actually going to be perceiving our house. We're showing that our house uses one-tenth the energy of his used house choice and that over a certain period of time he can save $20,000. We built a case in the text of the brochure that our house is indeed worth $20,000 or $30,000 more when he goes to sell it in five years or seven years, because of the quality that's built into it and the energy savings. We're creating that image that's enabling us to get a higher price out of the product which you need to get if you're going to put these kinds of things into the house.

The last project that I want to describe is our Winding Trail passive solar development of townhouses and patio homes in Boulder. This was a project that originally came out of a concept we developed for the American Institute of Architects' Research Corporation to do a moderate priced townhouse product for the Denver market, that used very little energy. We fell in love with the concept and decided to build the thing. Basically it's one that uses sun space and what we were calling a sun scoop. It's an attic that collects sun and has a simple fan that takes the excess heat in the unit and stores it in the rock bed underneath the house. This is what the units look like. When we built them they were, I think, quite attractive. They have one drawback. We sold fourteen of these at what I considered to be a moderate pace last year. One significant drawback was what we thought was really a great idea. We put all the bedrooms in the lower level below grade where they would be quiet since the townhouses have concrete walls. It would be very comfortable in the winter since we had the radiant walls and in the summer they would cool. The people didn't like them because there wasn't enough light down there. In our improved version which we have gone into this year we put the master bedroom upstairs, kept some of the bedrooms on the lower level still, and opened up that lower level for a lot more light. And these units are selling for the same price and selling about three times as fast. We're selling 1.5 to 2 a month of these.

In conclusion, regardless of the kind of housing, to be successful in the marketplace with energy conservation and solar housing, you've got to convey to your buyer that you've got a product of greater value than his other choices. Energy conservation and solar can be exciting and a powerful turn on, but must be done in the context of real value to the buyer. This is keeping in mind the particular market segment and the nature of the buyer that you're looking at. You're looking at not only the economics and economic factors, but at aesthetics, lifestyle, pride of ownership. I don't think there's any formula that I or anyone else can give you to market successfully solar and energy conserving homes other than good design and good execution of that design and a real understanding of your marketplace. You just have to be a better builder and a better designer and it'll work.

QUESTIONS & ANSWERS

QUESTION: You talked about energy conservation being relatively successful in the Denver and Boulder, Colorado area. The key features that sold the homes were the glassy fronts and all that. Were there any other reasons people bought them? Did you really push the fact they're saving energy in the long run or is it just the showy extras, as they call them, to get out the people buying?

MR. LEACH: No, it's very important and I didn't go into the basics. You start out and you've got to do an energy conserving home, one that works. That's very important. That's number one, and I think a lot of us know how to do that now. The problem is that now we're trying to figure out how to do one that works and sells. To get it so it sells, often you do have to compromise some of your energy conserving principles. We're ending up with houses that use significantly less energy than their counterparts in that it just doesn't make sense to throw the baby out with the wash if you can't sell houses. Then all of a sudden you go back to the old program. I think a lot of builders have done that. They've gotten very enthusiastic about solar and energy conservation, then when the buyers all come out and applaud but don't buy anything, then they and some of their competitors say well, it doesn't work, this thing doesn't work. But the truth is you just have to design a product that has appeal and where you can take advantage of those energy saving features.

QUESTION: How large is the market share in Colorado?

MR. LEACH: Well, in our city of about 60,000 people we have about 10 percent to 15 percent of the market share, but the interesting thing is that probably 50 percent, or better than 50 percent — 75 percent of the homes built are energy-conserving homes. They have these types of features or very similar.

QUESTION: You referred to a water wall. Can you just elaborate on that a little bit.

MR. LEACH: Oh, just Kalwall tubes is what we're using, 3' high, in front of the glass.

CHARLES SIMON: Architect, Toronto. I'm talking about minorities because I feel that in the market here in Ontario we're dealing with minorities. I feel that the market is still very small. We're very conservative. We're very conservative even by comparison with other places in Canada such as Saskatchewan and the Vancouver area. But I don't think that means that we have to give up.

It's the minorities who change the market. It's minorities who are causing changes all the time and they become majorities. I think what we have to work on, particularly in conservative Ontario, is to work with those minorities and cater to them. I don't think we are. We're being too cautious and we're being too defeatist.

I hope to illustrate this in one or two examples. One of the examples is changes that are coming about in our own direct experience. Obviously a key one that we hear an awful lot about is the big stick approach. What can government do to force people to do the right things that are noble and fine for the future? I think the big stick approach has its value. I think we need to upgrade our building codes and the R values in walls. We need to review our planning acts. There's a great deal we can do at the site planning scale and the planning scale.

As for lending institutions, lending policies need to be reviewed and there are regulatory things that I think are very effective. In Brampton, they've brought in not exactly a code but a planning legislation which encourages and tries to force, though somewhat tenuously, the idea of passive solar housing. That kind of legislative manipulation probably has its value. I don't think it should be overdone. In Davis, California, as I'm sure many of you are familiar, they've been extremely successful both in planning legislation and in terms of the building codes, in upping the standards and the regulatory controls and thereby bringing about change in energy conservation. But I think we have to be very careful in developing these controls. The one point I want to make here is, if we are going to bring in yet new legislation, since we really are over-legislated in so many areas in terms of building codes and everything else, we should implement legislation which is not going to be out of date the day that it's brought in. We all have different approaches. It is quite possible and demonstrable that an earth-sheltered house or a super-insulated house, such as the Saskatchewan model, or a house with a great deal of south facing, glazing and sun rooms are all very effective techniques and I just listed three at random. The kinds of ways in which you build the levels of insulation or everything else will vary with each technique because of materials you use and so forth. We should be very, very careful that when we bring in legislation, it should be what I'd like to call performance type of criteria, rather than prescriptive, where we say you will build in this way and in this manner and you will have insulation levels of up to R60, or whatever. I think we need some minimal levels, but we need to be very careful.

By performance criteria I mean we should look at the total system of the house and say how much energy is it saving per square metre or square foot? That is really all that we're interested in. We're really interested in conserving energy by whatever means and by whatever technique, whether it's high technology or low technology, whatever it is. Cost effectiveness will get itself sorted out in the marketplace. And so if we can bring out ways of measuring the comparative and the valid, and we can say here are the performance criteria, here are the standards to meet, in a very gross way, then go about it as you will.

The same might be done to the planning scale in terms of solar access. If we could guarantee certain minimum levels of sun getting to your house because it's not being blocked by my house, that is really as far as we can go. Then if we say that you conform to that performance, then maybe you can build right up to the edges of your lot, maybe you can fill the whole lot if you bury your house underground because you're not going to share with your neighbour. There are many areas of flexibility in design if we keep our legislation flexible.

Personally, I prefer the carrot to the stick. I'd much rather deal with incentives. Certain obvious incentives are just straight gifts. The government gives you so much to insulate your house or to get off oil and get on to gas or something healthier like electricity which is deemed to be the healthy way to go. Direct grants are fine. They're a good way of bringing about a change and initiating change and they're particularly very valid where people are taking risks. Where they are dealing with a woodchip program or there's some piece of technology or some techniques that are innovative, that are full of risk, and so forth. So the idea of direct grants I think are very good, but there are an awful lot of things that we can do by way of incentives which are really far more inexpensive or even free.

I think the whole way we deal with economy, the whole way we deal with payback periods, the whole way we deal with costs are really very, very shortsighted. If we deal with life cycle costing for example we see that CMHC's having great troubles with it. We can look at the costs of a building or its reasonable life cycle and then the whole economy will change totally in the future. Now, I'm very aware of the problems of this concept, but I think we have to deal with these concepts, we have to begin to introduce them into our lending policies and so forth. Some lending institutions, incidently, will give people more favourable mortgages now if they are integrating energy conserving techniques because they realize that the actual daily, monthly, yearly cost to that consumer of a house is going to be less. So I think there are a great number of incentives, some of which are disarmingly simple.

I think the change in legislation in the United States whereby the electric utilities have to buy back electricity you may generate in a decentralized manner could have a remarkable affect on the development of generating electricity in a decentralized manner. That is really at no cost to the consumer or to society, and yet it is a change in legislation which offers a great incentive to development of, in this case, possibly high technologies.

I've worried a little bit that at conferences when we have such an impressive gathering and when all of a sudden energy conservation in a very, very short time has become terribly respectable and is placed right up there on a pedestal with motherhood and the maple leaf, that maybe we're overselling a little prematurely.

There are a lot of people with skills but too many architects, the vast majority, are really not capable of coming through with houses and housing that performs, in terms of energy efficiency, adequately. I feel there's a tremendous amount of education to be done in terms of building trades, in terms of the consumer usage, in terms of architects and designers, and building inspectors, and so forth. We could be doing a great disservice by overselling the possibilities before we've developed the techniques and here I'm talking about recycling people more than anything else, getting people up to scratch so that they can perform to the levels that we know we're capable of in terms of energy conservation techniques. I believe we have to be a little cautious about overselling this whole area, but in no way should this make us cautious in terms of innovating. We've been innovating since way back when it was thought to be pretty kooky and pretty strange. My theory is what we need is a whole lot of very small mistakes. We need a lot of little failures, a lot of little experiments, some more work, and a lot of little successes. We can learn from the successes and we can learn from the failures without having to beat the drums about them too much.

It seems to me that so many marketing strategies today are trying to deal with the average consumer. I don't believe here everybody's up or below his average, nobody's really average. It seems to me that the Marie Antoinettes of the residential marketing world are trying to tell us, 'let them eat pablum.' Everything we get is the same. Everything is very, very average. If you go around to any housing estate, people are not that average in my opinion. I think our own clients reflect this.

Our own clients are really a minority. We started to be interested in the area of energy efficiency back in the early 70's when it was thought of as really quite strange, a suspect area to be interested in. We didn't go for any financing, we didn't go for any government subsidies. We felt certain clients would go along with our kind of crazy ideas. One of our houses, for instance, was built in 1974 and was one of the first sun spaces built. I think it was the first in Canada and it doesn't overheat and it works and it's still functioning. This costs no more than other market houses in the Guelph area at that time. It was built very, very inexpensively, finished off by the owner, and it works. So there are a great number of things we can do without any subsidization or government programs. This is really how we got going, and how we have been going most of the way.

There was an earth-shelter building that we did very early on. We sold this to a client not on the basis of energy because he could care less, in 1975, about energy conservation, but we did it. Energy conservation wasn't just a selling technique, it was a genuine reason because we wanted to get into the hillsides in the Caledon hills, and we didn't want this thing sticking up like a sore thumb. The earth is sheltering it and protecting it — four or five feet down that earth is a nice 50 and it's keeping that house nice and snug and warm. It fits into the landscape, so we did it for good design reasons. I can't agree more with the last speaker that design is absolutely critical and in making the houses attractive, they also sell.

A lot of things we can do are really very inexpensive anyway. Our underground house just proves that you can break any rule. It is built into a very steep, north-facing slope and yet we're getting 60 percent of the energy out of a sun room on the top, on the south face. I won't show you the south face. We're doing a lot of houses with sun rooms, with vertical faces. Now in the Hamilton area we have a house in which, again, about 60 percent of the energy will come out of that sun space as purely passive. We take the air, induct it to the inside. The house is built into a fairly steep hillside facing south, for once the right way around. Shading is a very big issue and there we had a trellis.

We're getting more and more involved in planning, and so there's a change, a shift. The Ministry of Energy is backing this idea. People are getting involved with subdivisions where simple things like orientation and the way we plan and lay out these buildings can lead to very simple savings.

I believe our clients reflect the public. They were the pioneers. They were changing people. And what we have to identify are those people that are the generators of change. I think that there's a whole lot of minorities who are disenfranchised by the kind of pablum that's being dished out in housing today. We need to identify them, to find them, and we need to build houses that really work and prove that it will work. The changes that have happened in the last 5 years have been staggering, the changes in the next 5 years will be even more so because we don't have any clue at the moment what the escalation of cost is going to do. Basically, the most fundamental strategy for selling energy conservation is coming from OPEC, and they're doing the work for us.

Goldie Edworthy:

An expert in energy management in residential housing, Mr. Edworthy is a member of the firm of Enercon Consultants and is working in research and development, sales, marketing and administration. Enercon is based in Regina, Saskatchewan.

I must begin by saying that I find it extremely difficult to speak about marketing energy conservation in the residential housing sector because, in my opinion, very little actual marketing has occured in the area. To date, most of the activity has been directed at what I would call the premarketing stage. This stage is primarily concerned with concept development, product development and demonstration. There is a very simple reason for this emphasis on development and demonstration. At present, only 5 to 10 percent of the North American society has seriously considered adopting energy conservation measures. The remaining 90 to 95 percent must be convinced of the benefits of energy conservation and its related products.

Energy conservation, which I'm sure you're aware, has a number of virtues. For the individual North American, energy conservation can reduce costs, up to 85 percent in residential housing, and provide him with a more comfortable environment in which to live. On the national level, energy conservation is anti-inflationary. Energy conservation strategies can reduce our need for high priced, imported oil and, consequently, reduce the strain on our federal deficit in balance of payments. As well, it can relieve the pressure on our financial institutions to produce vast amounts of capital for large energy projects.

In addition, energy conservation is more environmentally sound than other energy sources such as coal, nuclear power, and electricity. Energy conservation does not produce such environmental hazards as acid rain, radiation, and erosion which are associated with these other sources of energy.

It is unfortunate that a large part of today's society is basically indifferent toward the concept. This indifference is related to our present emphasis on energy supply as the answer to our energy problems and society's unwillingness to accept change. In the past, and at present, most of the North American institutions which are in a position to influence change in energy policy have stressed an increase in energy supply of conventional energy such as oil, gas, and electricity, and have ignored energy conservation as a solution to our energy future. I must point out that the individuals involved in these institutions grew up and were trained in a supply oriented environment and are excused to a certain extent for their perspective. However, until society's attitude becomes more positive towards energy conservation, we will have a very small market indeed.

Energy conservation, as I'm sure you will agree with me, represents a tremendous opportunity to society. My colleagues and I at Enercon are convinced that energy conservation can play a major role in being the answer to our country's energy problem.

Enercon is a Regina-based company which is actively engaged in energy efficient residential building. Enercon designs and drafts low-energy passive solar homes, licenses builders throughout North America, and manufactures air-to-air heat exchangers for residential use. At present, Enercon is developing low temperature thermal storage systems, thermal control systems, and window shutter systems. Because of the public attitude to energy conservation, Enercon has developed a market push strategy, a strategy which places emphasis on the sale of concept of energy conservation.

A variety of steps have been taken by the company to promote a general awareness and understanding of energy conservation. This has included the construction of a demonstration home which incorporates low-energy passive solar techniques in its design. The "Passiful" house, as it's been named, was and still remains Enercon's most successful public related project. It has received attention on local and natiional television, and has been written about in such magazines as Popular Science, Civil Engineering, (?) Energy Notes, Readers' Digest, Canadian Magazine, Harrowsmith, and Financial Post. As a marketing tool, the Passiful House has been Enercon's trump card. Many of the tours through this home and much of the free publicity which was generated by its construction resulted in the sale of consulting and/or building contracts.

The undeniable success of the Passiful House prompted Enercon to build a few small spec homes in a new subdivision of Regina. These homes, upon completion, were sold through a local real estate company. Emphasis was placed on decreased fuel bills and increased comfort. Unfortunately, the project was not a success. The failure of this scheme could be attributed to a number of factors. For one thing, sales staff of the local real estate firm was ineffective in its attempts to market these homes. The staff could not explain the energy efficient aspects of the house adequately, nor were they committed enough to the concept to be able to rationalize the additional cost of these features.

It is most important to have sales people who understand energy conservation. This realization led the company to establish its own real estate firm. The sales staff was instructed by a team of professionals in the basic concepts of energy efficient housing and, needless to say, they made more progress.

Unfortunately, the housing market in Regina has reached the slump period, a slump which continues today. Although we eventually managed to sell most of the homes, we are now wary of spec homes, and are only committed to the construction of pre-sold homes. As well, we discovered that the particular segment of the market which was interested in a 950 — 1,000 square foot home could not afford and was less interested in energy conservation. Most small homes, as you may be aware, are purchased by young couples who have never been homeowners, have never paid fuel bills, and are financially restricted. They could not afford the higher price initial cost of an energy efficient home, and could not relate to high fuel costs. Consequently our homes were not particularly appealing to them.

We soon came to realize that farmers and professionals who had more capital and a greater appreciation of a quality home were our best immediate market. They were interested in larger custom-built homes. Thus the successful custom home designing and drafting service was established with primary emphasis on good service through professional contacts, personal contacts and simple education through detailed plans and written material. At the same time, the company has been involved in promoting the concept of energy conservation through trade shows, exhibitions, and speaking engagements. Only limited advertising was attempted. As surveys of our customers revealed, the contact was primarily made through former customers, magazine articles, and speaking engagements. These activities, combined with the results obtained from the Passiful House, have helped establish credibility for energy conservation in Regina. And have laid the groundwork for the next marketing stage.

At the same time, Enercon has been developing quality products and services for the time when our society is ready to accept the concepts of energy conservation. We anticipate that our products, such as air-to-air heat exchangers, window shutter systems, and thermal storage systems, as well as our professional services and building design will be the focus of our future marketing strategy. Once the credibility of the concepts and products related to energy conservation is established, the real market will begin to appear. We will then be able to implement a market pull strategy where the consumer will demand products and services. Our efforts will then concentrate on selling the products, rather than the concept. And emphasis will be placed on such factors as product quality, price, and service.

As a small pioneering company, Enercon is preparing for this market demand by establishing distribution and dealer networks throughout North America who will provide the necessary contacts and service required by the consumer. With respect to housing, we have licensed builders in Canada and in the United States to construct energy efficient homes designed by Enercon. Participating builders are provided with the knowledge and details required to build low energy homes, home plans, and engineering and consulting services. As well, these representatives are being supplied with local and national market exposure and sales aids including promotional literature, news releases, site signs and construction signs.

The Passiful House is used as a key marketing tool for the licensing package. It is a home which can be constructed by any builder, can satisfy the many legal, financial, sub-trade, and market requirements of the construction industry at this point in time. As well, it combines simple elegance with technical sophistication and wraps this in a cost competitive package for the mass market. It is intended that the Passiful House, wherever it is located, will continue to receive national exposure as an attractive, cost effective, low energy passive solar structure. Both the licensed builder and Enercon as its licensor will benefit from the resulting publicity.

Enercon, as you've probably realized, has approached the energy efficient housing market from three levels, construction at the local level, custom designing at the regional level, and licensing throughout North America. The primary emphasis in our marketing strategy is focused on demonstration, demonstration that energy conservation is a simple and less costly solution to the energy problem. The marketing tools which were used were directly related to the financial situation of a small company. They were primary in low cost and free and very effective.

As the demand for our products and services rises, and the cash flow from increased sales is generated, we intend to shift toward higher priced advertising on radio and television. As this demand is created, we hope to be able to re-orient our marketing strategy from a market push to a market pull perspective. Marketing the concept of energy conservation is, without a doubt, an essential step in any marketing strategy linked to the energy efficient housing market. However, I feel that the time is near when we will be able to concentrate all of our efforts on selling the products.

Jim Moodie:

Project Manager of Champlain Heights Development Group in Vancouver, Mr. Moodie's group is responsible for the marketing of land and the control of development budgets for the Champlain Heights project, a city-sponsored development which features innovative solutions to housing problems.

Champlain Heights is a large city-sponsored development. The city was fortunate enough, during the late 1920's, to pick up a little bit of land and they kept that until the 1970's, and then started to develop it. I'd like to say that there was a planning process that went on all that time, but that really isn't the truth. The fact was the city just grew out to that corner and, in 1970, the pressure was there, so they started to look at some development options.

My job as development consultant is to do not the planning but the implementation and the marketing for the city. I wanted to tell you not about the Champlain Heights project in general, other than to give you a little bit of the flavour for the development.

It's basically a planned unit development scheme. It has a central walkway down the middle ringed by a loop road. We have a large mix of housing. We look at providing housing for all incomes, and all age groups. We have market housing, rental housing with generally a high quality of design. We have CMHC co-op housing. The older stuff we got along with quite well but trying to meet CMHC's new housing guidelines has caused us a bit of a problem. We think we're not going to meet the maximum unit prices.

Our residential energy conservation project started at City Hall. That might have been the wrong place for it to start, but that was the inspiration. Council passed an omnibus motion back at the end of 1977 which was very perceptive. It said that there was something going on in energy and therefore the city should get involved. Our particular group happened to have a piece of land in Champlain Heights that we thought we could put an energy demonstration scheme together. So we started out in the usual process of doing a study, assembling a team, looking at this eleven acre site and seeing whether we could get something which would be a marketable, unsubsidized energy conservation project going.

I want to emphasize that we were not looking at anything that had participation by the federal government in the sense of a CMHC funded program. We were looking at seeing what we could do with your traditional spec built housing. We went through very agonizing processes but it was worthwhile, and I think the end result has paid off.

We assembled the team and went out and looked at the site. That seems to be the obligatory first step. What we were looking for after the team got together was a group of developers who would join us and actually take the risk of building the project. That turned out to be a fairly large hurdle. It's all very well to sit around in a group and talk about this type of technology and that type of technology, but to get the developer on board who will actually take the big risk turned out to be a bit of a problem.

Initially in our program we had some trouble getting over the hangups with the technological solutions. I think in our piety we seemed to be seduced by thinking that there's an easy technological solution to most of our problems and so we looked at a lot of the active systems. We were dazzled by this technology and it influenced a lot of our early thinking. We went into the passive stage of our project. I'm not here to deride passive, but what I am here to tell you is that, from our perspective, when we looked at cost effectiveness, and when we looked at the marketplace in Vancouver which at this stage was not very sophisticated, to say the least, this type of thing wasn't something that we felt was going to sell. The example of course here was that technology seemed to have totally taken over from any thoughts of whether the house is going to be something that people want to live in. Another similar example might work in Davis, but it's not going to sell in Champlain Heights.

We put together the game, and we got our developer. We ran ads saying we were looking for a conserver developer, and that seemed to appeal to some of the developers' public image. They felt that being a developer was kind of bad, but being a conserver was kind of good, and to balance, we'll do some work for the city as conserver developers. We put together the team that included John Hicks and Jim Leach whom you heard earlier today. We adopted a very cautious approach. And I want to emphasize that we were cautious because someone was putting 10 million dollars worth of investment on the line and that has a really sobering effect when you really start to think about it.

What we tried to do when we got finished with all the fancy systems and the technologies was to try and simply make the house work better. We tried to build an efficient home, and for some of you sitting there, you probably think these guys are pretty slow. This is early 1979, and they're just starting to get that message. Well, that may be so. We may have been slow. The thing we wanted to avoid, though, was being remedial and making the same mistake over and over again. We felt we had to go through this experience. We had to learn ourselves because nobody in the Vancouver area was doing this type of thing. So for us it was a learning curve, but it was a hands-on situation, and we were all moving along together. We kept a fairly large net. We tried to involve as many other people as we could so that the learning experience was shared.

We looked initially for sophisticated and complicated answers to fairly simple questions and it wasn't until we got our team asembled, which included the people who had the hands-on experience like Jim Leach, John Hicks, like our marketing people, that we really realized what we were supposed to be doing. We really started to focus on cost effectiveness. What that meant in Vancouver where we have a plentiful supply of natural gas was that we could make the largest savings by simply going to a gas furnace. The result of our critique by the team was that if we went to that type of system in our solar west project as opposed to the common spec built, baseboard heat units that had been popular up until then, we could make very significant savings. By putting in the most sophisticated gas forced air system that we could find, the electronic ignition, continuous fan, flue, dampers, all those things, we found that we could make a saving far in excess of what we would have gained from going with energy efficient walls or going with the greenhouse additions and that sort of thing.

We also found a bit of a problem in that by the time we had looked at some of the other features on the houses, like super-insulating, like tightening up the shells, that the gas furnace that was available on the market at the time was far too large for what we actually needed. Our engineers determined that we needed a furnace with a capacity in the neighbourhood of 27,000 BTU's, and of course the only thing around at that time happened to be 65,000 BTU's. We were told that if we could just wait a couple of years, something else was coming and it may be on the market, it's just being tested and all that stuff. In the real world or in the marketplace, waiting 2 years isn't always an option.

After the heating system we found that the next most cost effective thing was the insulating. We've put in two efficient heat recirculating fireplaces in each house. We're up to double glazing. Some of you may say double glazing, 'they're really progressive out there on the coast.' You have to understand that we live in a semi-tropical climate out there, so double glazing is a big improvement. We also went to air lock entries. People have sat down and done a cost analysis on that little goody and have told us that it is bizarre. There is no way that we should have been doing air lock entries. It was something that people related to and said, of course, if it's an energy efficient home it has to have solar panels on the roof and an air lock entry, so that little business did end up staying, but I'm not sure of its cost effectiveness at all.

We looked at passive solar gain. We did move our windows around to the south side of the building. We minimized the amount of glazed area on the north side and all that sort of stuff, but we didn't try and let it bias what we wanted to try and do in terms of building a unit that was going to be acceptable in the marketplace.

When we put it all together, in this particular project, we ended up with a house where we had added, we felt, approximately 3 percent to 5 percent to the purchase price and we're talking a purchase price, in round numbers, of about $100,000. To compare with other Vancouver homes we're looking at an uninsulated, oil-fired, 1,800 square foot house which is approximately how big these are that costs around $1,200 a year to heat. The typical 1,800 square foot spec built house in Champlain Heights prior to the solar west project would have had minimum insulation, electric baseboard heating units, etc., and would have cost about $600 a year to heat. These units we projected to cost approximately $200 a year to heat.

In the early part of 1980, we actually got on to the site and started construction, and the first phase went up fairly quickly. The first phase sold even faster. At this phase of construction, all the 47 units in the first stage were sold. Of course we all know that that was solely due to the fact that they were energy efficient units. The consumers flocked out there and snapped them up. Not true. The fact of the matter was that the provincial government came along and offered, again early in 1980, mortgage money for 3 years at 9 3/4 percent interest and people flocked out to anything that looked like a home and qualified and snapped them up. So unfortunately, as far as our monitoring program on the first stage was concerned, we didn't have much consumer feedback to tell us whether in fact people were making that decision because of something to do with energy efficiency or whether they were making it to do with something called mortgage rates.

The houses that we were doing we tried to make look ordinary, like any other houses. We did have eaves and I mentioned that we put minimal windows on the north side of the house. There's the air lock entry which, in the second phase, we tried to make a sales feature. We put in a french door, inside tiles on the door, elaborate space, access to the garage and all those things to try and make it a little more attractive. There's a small greenhouse provided on the back of the family room. Basically we were hoping that we could sell that as a nice place to live.

Initially we were talking about doing only things that were cost effective and only things that did not have a subsidy. That only took us so far because somebody came along who said he was a solar manufacturer and said he had just applied for a great government program whereby we could have all 94 units in solar west equipped with solar collectors and it wouldn't cost the individual homeowners anything. We said okay, it's not going to cost them anything and maybe we can rationalize our way around that and have the solar collectors put on the roof because all energy is subsidized. We had roughed-in all the units with plumbing up to the attic space. We had provided enough space in the utility rooms so that the second tank could be placed in there on the basis that some day off in the future when energy costs go up and all that, the solar collectors will become cost effective. It happened a lot sooner, that's how we argued that one.

One of the interesting things was that, in the public's mind, once we got collectors on the roof people started to say gee, that now is energy efficiency, they've got solar collectors up there and it really improves the perspective of the project. It took us three years to put this thing together, and that's a long time, particularly with the mortgage rates that we're faced with. During that time we went through a lot of publications, we learned a lot, we talked to a lot of people and we think we have some knowledge to share.

I just wanted to tell you a little bit about something under the heading of marketing financing in the real world. I don't think today energy costs are significant in terms of the home purchaser's decision to buy. If we look at mortgage rates today; take an 18 percent mortgage on $100,000 principal, a quarter point on that mortgage rate, $300 per year. So you would be better advised to spend your energy hitting your banker over the head to knock that quarter point off the mortgage than you would be doing all your weatherstripping, insulating, and all that jazz. Now, okay, that's another topic for discussion, and probably we should have another seminar. We should invite Mr. McEachen here to explain why we can't reduce interest rates and all that sort of business. Obviously we need to do both things. We need to do that, and we need to do the energy conservation business, and a whole lot more. But it is important to keep that in mind. When we're dealing with the market, when we're dealing with an unsubsidized situation, if you start talking about adding things to these units — let's say we add $10,000 in features; at today's interest rates, we've just added $1,750 to the cost to that homeowner to carry that $10,000. Now that's sounding like a lot of money, especially to me. If we look at the cost of home ownership, average mortgage again $100,000, $17,000 per annum to amortize that, taxes around $1,500 for all the great services we get in Vancouver, and way, way down there are those annual heating costs of $200, $300 per year. They will go up, but I don't see taxes going down, and I'm not confident that interest is going down.

I talked about the vestibule. I don't need to tell you all about that, except that it's about $700 a year to carry that little item, and I don't think people perceive it to be worth that much. You've got to design the things in, you've got to make the people think they're sexy and they buy them because they're sexy, and not because they are energy efficient and energy conserving. A good designer can do that for you.

We have to understand what people will really do. We looked at turn-down thermostats, a very expensive system that's hung on the wall just because people are too damn lazy when they go to bed to move their finger along the thing. Then you ask them to move insulated shutters in front of all the windows, pull down the blinds, do all that stuff. I don't think we're there yet. It's getting pretty bad. I think I probably should stop because I'm just going to get in more and more trouble.

The Champlain Heights experience, I think, was a good one. I think it's repeatable. We did it for the city of Vancouver. We got a developer involved who was willing to take the risk. The total cost from our side for doing all those fancy brochures, for flying all these consultants around the country, for co-promoting the project — probably about $50,000 over the three years. The city netted a million dollars out of the ground lease revenues. The builders put up 10 million dollars in product. Unfortunately the market right now is curving a bit but that will turn around no doubt. Commitment — co-operation — I think if that's there, then the benefits are worth the time and effort. The bottom line is that we can get people into a house without that much effort, as you've seen, with their annual heating bill someplace around $200 without a lot of strain.

QUESTIONS & ANSWERS

QUESTION: I just wanted some clarification about the houses that were built in Colorado. What type of housing did they represent? Were they production units largely, and what end of the market?

MR. LEACH: They were all types from the very low end, which would be the $70,000 units up to $300,000 plus, so there's a whole spectrum. It just depends on where you're at how you design it.

QUESTION: In all of these houses, they have a tremendous amount of glass here, facing south, and I didn't notice too many with large overhangs. Do you have much trouble with overheating in summer?

MR. SIMON: We don't have a problem because it's a very big issue. When I'm talking at any great length about this, one of the points I bring out is that we should design for the southern Ontario climate. We're on the same level as Barcelona in terms of latitude. We tend to forget that. We need to design houses that, in the summer, are very much like southern plantation houses. We don't have permanent overhangs because I want to get all the sun I can in the winter, but we do have moveable trellises. We use plants, we use canvas awnings, we use all kinds of different shading devices. It's absolutely critical, yes. If you do all of that, then it works fine. And the other thing we do is use a vent stack effect which can actually calculate from a formula that was derived around the turn of the century. Now, that's progress. We've lost this formula which can give us the equivalent of 2 to 3 tons of air conditioning in just natural air rising just by the natural way hot air rises like you learned in high school. And you can induce that by having the vents at the bottom of the house and the top of the house and the vent stack at the right side so that you can induce an incredible draft. And I've experienced it on a totally still day, and that will give you a lot of cooling. So there are a lot of things we can do. The two major ones are vent stacks and shading, and I like moveable shading so that in the winter we get all the sun in, and in the summer, we can shade effectively.

QUESTION: In Mr. Moodie's comments, he mentioned that the orientation of the lot and the house was not one of the things they were terribly concerned about in Champlain Heights. Earlier, in Mr. Leach's comments, I believe, he mentioned about some experience with the builder where the builder built the units in any direction. Obviously they are making better use of the saleability of the design of the product rather than of the solar heating aspect. My question is when you're dealing with rather narrow frontage lots, say 45 feet and less, and when you're trying to get a design which makes good use of solar, and at the same time is attractive, how important is it that the lot should be oriented in a north-south direction?

15 Consumer Education In Energy Conservation

Louise Landry:

Community Energy Co-ordinator of Frederickton, New Brunswick, Ms. Landry is a former lecturer in the clothing and textiles field and a former housing rehabilitation officer for the city. Her present appointment is one of the first of its kind in Canada.

In Fredericton, when we tried to develop a retrofit seminar series, we broke all the rules of marketing. It was a series of 10 residential retrofit seminars held in Fredericton last year from January until March, one night per week.

Fredericton's energy conservation office was established in July, 1980, as a direct result of a 10-month, federally-sponsored demonstration project. One of them was Richmond Hill, not too far from Toronto, and the other was Vernon, B.C. Fredericton, of the three original demonstration projects, is the only survivor.

These original projects were intended to involve citizens in energy conservation programs that, to a great extent, were actually initiated by the citizens themselves.

When the energy conservation office was formally established, a full-time community outreach energy co-ordinator was appointed. That's me. As far as we know, Fredericton is still the only municipality which has taken a fiscal responsibility for community outreach in energy conservation. Since the time that our office was established, I've been the recipient of numerous telephone calls requesting credible, practical information on renovating existing housing for energy conservation. It seems to the uninitiated and to the novice that there is an abundance of information available on the renovation of housing for energy conservation but the validity of some of this information tends to be questioned. Very often, because the information is so abundant, the consumer often ends up being more confused than actually educated.

As a result of hundreds of telephone calls, it became quite clear that someone or some organization would have to take the responsibility for providing that practical, credible information that was so desperately needed by homeowners and even some of our contractors. As a consequence, a group of concerned and informed individuals representing related energy fields requested a meeting for the purpose of organizing an adult education program in energy conservation.

This entire series took from September until mid-December, with approximately one meeting every two weeks, to organize it. All of the people that were involved in the organization of this seminar series had some other job at which they were working full time. As a consequence, no one person could devote full time to the organization of the series. It was my job to make sure that these people came together on a regular basis, that momentum was maintained and that the direction which the group was taking tended to remain on track.

In total, there were about seven meetings of this organization committee to actually work out the details, the structure and the implementation of the seminar series. We had a representative from the University of New Brunswick who was a specialist in marketing courses and, according to him, we broke all the rules.

I can't tell you about this series without emphasizing the importance of community support. Without contributions from a large number of organizations and individuals, the seminars could not have been held cost-free to the participants. It's therefore important that these organizations are mentioned because all too frequently we take them for granted — take for granted the support these organizations provide in our communities, or we overlook them entirely, and they are a very valuable resource.

No commercial products or services were entertained as content for these seminars. We stayed completely away from the promotion or the discussion of specific products or services.

A whole evening devoted to codes. There are lots of people who enforce codes — electrical codes, plumbing codes, the national building code — but it is difficult to find a speaker who is well versed, a good speaker and who can entertain a little bit while they are speaking to their audience, without constantly frightening them as to what are all the wrong things to do. To find people who are knowledgeable and who are also good speakers is a bit of a problem, and I don't know how you overcome it. For the benefit of those people who were interested in what to do with their existing homes to utilize the sun as a source of space heating, we did put on a seminar in passive solar retrofit. We tended in this particular session to get more of the people who were interested in new construction rather than retrofit.

On an evening in week 10 we brought in the entire resource group and it was a whole night of free consulting services. For the consultants themselves, that's great stuff because it further helps them to promote themselves. For the people who are participating as learners, it's even more important because they are getting good sound advice.

It was felt that rather than offer the series as a 10-week course, offering it as a seminar series with different topics each week would allow people who were already involved in their retrofit projects the opportunity to pick up a session which was of concern to them and eliminate the sessions covering activities that they had already completed.

During the 10 weeks, a total of 153 people participated as learners. That may not be a lot in Toronto, but it's a lot in Fredericton. Each week, there would be approximately 45 to 50 people in attendance at any one of the seminars. Since the series was not held as a course with registration and fees involved, attendees were free to come and go from one week to the next if the subject matter was of interest to them. Therefore, we did not necessarily see the same people every week but rather saw numerous people who attended one or more of the seminars.

The target group obviously, was the homeowner with an existing house, rather than the individual who was interested in building a new one, although we did get some of those as well. There were also a number of contractors who attended a variety of the sessions including those in the heating, insulation and air sealing trades.

As to the outcome, paying attention to the questions the participants asked throughout the series was quite a revelation for the speakers and for myself. We really have to give consumers a lot more credit than we have been. It seems that some of these people have read everything they could possibly get their hands on, they sifted through material which is weak or irrelevant and are looking for information that is technically strong yet is practical and is as absolutely accurate as possible.

The retrofit series is continuing this year, but under a slightly revised format. We've brought session 10 from the old series forward, and this is the kind of thing that we are going to continue to do. Under this new format, the resource people were divided into teams and worked in small group sessions of 20 minutes each. We found that 20 minutes really wasn't long enough — half an hour would have been more preferable. The individuals who attended had a one-to-one contact with the person that they deemed to have the expertise that they wanted to tap. At the end of the three 20-minute sessions, the entire resource group reconvened as a panel and brought forward some of the critical questions that were being asked in the small group sessions and shared them with the larger audience.

The audience then had the opportunity to ask further questions of other resource people that they hadn't had a chance to meet in the small group sessions, or to expand on the questions that were raised in one of the smaller groups.

What about the effect on the housing stock in Fredericton? Conserver House — the federal-provincial demonstration project, is a house that's about 80 years old and has been almost completely retrofitted, and they are also getting into their information transfer stage.

About half of the housing stock in our city was built prior to 1949. In fact, in Frederiction, we have a fairly large number of historic buildings and we do like to preserve the historical integrity of some of them. We also have the average bungalow. We also have the average two-storey house.

A number of the homeowners in Fredericton have participated in retrofit of the first-generation nature — insulation, weatherstripping, caulking, storm doors, storm windows. It should be safe to say that up to 60 percent of the residential buildings in Fredericton have been retrofitted in this first-generation category. Second-generation retrofit projects are occurring at perhaps the rate of 35 percent and these would include such items as attaching sun spaces or greenhouses; installing newer, more efficient furnaces or converting to an alternative source of fuel: perhaps attaching vestibules or enclosed porches at entryways, and so on.

To put these activities in perspective, it is perhaps necessary to say that their has been very little new construction in Fredericton for over a year. This is due to the effect of the rising inflation rate, the cost of mortgage money, rising fuel costs, and so on. Therefore, more attention in Fredericton appears to be being paid to the retorfit of existing housing stock and toward conversions to alternative fuels from petroleum products.

It is our belief in Fredericton that the energy crisis is upon us, that we recognize that whatever non-renewable fuels there are, that they are limited in supply — that they are not only limited in supply, but what remain are going to become even more costly to produce in the future.

Consequently, our consumers are paying attention to national concerns and practicing conservation in a major way, and the response to our seminars has been extremely enthusiastic and, yes, more are anticipated.

Lucille Brisebois:

Chairperson of the National Housing Committee of the Consumers' Association of Canada and a director on the board of the association. The Consumers' Association of Canada is a non-profit group of volunteers representing consumer interests. Ms. Brisebois lectures on real estate and has published a book which is a guide for the consumer on house buying.

The Consumers Association of Canada is a voluntary group working for the interests of consumers since 1947, and it is the only national consumer association in the country. It has 190,000 members in all provinces.

In the energy crisis, Canadians are among the greatest per-capita energy consumers. This is due to our extreme climate, vast distances and highly developed technology, and also due to luxury consumption and wastefulness that were encouraged by our seemingly limitless supplies of fossil fuels, such as natural gas and oil and coal.

We now know that our fossil fuel supplies are not limitless, especially the oil on which our transportation industry depends. We are forced to import more and more oil at steadily rising costs from sources which are becoming less and less dependable. So, we are all aware of the concerns of industrialized countries facing a sharp curtailment of export of oil from the Middle East, and the price escalation of the organization of petroleum exporting countries in 1979.

We still have not recovered from the effects of the oil-induced inflation. It was also the first time that oil exporting countries were setting an embargo on their products for political reasons. The situation in the Middle East has not improved, and there is now strong collective endorsement of national efforts to conserve and to make greater use of energy forms as a substitute for oil.

Concerning energy in the housing sector, the Consumer Association of Canada, during the '60s and '70s was getting complaints by the thousands in all provinces from consumers who had bought houses and whose contractors were not respecting their contracts.

Some of the complaints were from purchasers who did not get the quality of building material they were supposed to get. Others had major defects on their houses or smaller details that they didn't agree with. Others were faced with problems of contractors either disappearing or going bankrupt, and they had to finish the house themselves.

The Consumers Association, on every possible occasion, asked the housing departments in federal and provincial governments to get better protection for the consumers in the housing sector and, during different conferences, we asked for higher standards on home building, a building code, and developments of new warranty programs to meet the needs of purchasers of homes in Canada.

This warranty program was offered to Canadians in 1976, so although it's not offering the same protection in each province, it seems to work well.

In Quebec, during the last year, the provincial association of home builders reports received some complaints. They were settled easily and with the co-operation from the contractors so that settled that area.

The decision to conserve energy of course and use less oil in Canada affected the housing sector. The first thing we realized in that sector is, in order to use less oil, we would have to use other means of heating our home so we can use electricity, natural gas or propane gas, wood, thermo-pumps — any of these products available.

We can also realize that our homes were not built for our climate — and that was quite a discovery — and that we had to start insulating our housing stock and build our new homes with energy-saving techniques.

That's why the federal government presented the Canadian Home Insulation Program (CHIP) which provided a taxable grant to householders of up to $500 and to help cover costs of insulation material and labour. During 1980, approximately 500,000 houses were reinsulated under the program.

Consumers, when they receive a grant from the government for such a purpose, have then to look for a contractor to carry out the work. A lot of workers in the building industry were without jobs at that time and started in the insulation business in order to earn a living, so quite a number of them were not competent to do this kind of work and CAC started to get complaints.

There's a large quantity of pamphlets and information on the subject of insulation and energy distributed by governments and by the CAC and this is quite new. Information was not available a few years ago, but today it is. It just doesn't seem to reach all the people concerned, and they usually get themselves in trouble before calling a consumers association.

We are conducting a test survey on housing in our association as a pilot project, and we are trying to find out which information consumers need exactly in housing — how they will take the decisions about housing problems.

To save energy is the issue of the day, so to encourage conservation of energy, a new national program is offered to replace oil for heating our homes. That is another reason that the government will inject sums of money, and then the consumer then has to decide what to do with it and how to use it.

The Canada Oil Substitution Program — COSP — was introduced in October, 1980, also as the cornerstone of the federal government's intention to switch off oil to alternate sources, to natural gas, hydro electricity, coal or any other form. COSP consists of two elements: providing assistance for off-oil conversion, and a distribution system.

Under the national energy program, the price of oil will rise to levels to make other fuels, especially natural gas, attractive on price alone. However, for many households and small businesses, the initial cost of replacing an oil-burning furnace with a natural gas furnace or electric heating is still too expensive. Therefore, taxable grants of 50 percent of the conversion cost up to a maximum of $800.00 available to help cover the expenses of converting away from oil.

Canadians now are facing making the decision again as to what change they will make. Advertising and phone calls directly to your homes are made by people anxious to get that business. Consumers association information centres are also getting calls from consumers to help them decide what they should do. Our Canadian Consumer magazine publishes articles on the subject in order to help consumers decide because this is a big problem — do we really need all that insulation, do we need all this renovation. It's helping.

Our housing stock is getting into a better condition. It's also helping people getting jobs. I suppose this is probably the main reason why we have these grants — it will start construction again, and the economy starts rolling and we really are conscious of this.

What equipment to buy and what energy to choose in order to heat your home is an important issue for homeowners, and they also have other problems these days because of high interest and the large number of Canadians are now not even sure to be able to keep their homes. They say something like 100,000 are supposed to lose their homes within the next two years, so people need information on what to do, and I think this is probably where our association will be very useful.

We have to inform them as much as possible in order that they will make the right decision. And CAC is available to help homeowners in all provinces. We have provincial associations in all provinces, and also local sections.

We all know that housing is very expensive right now and also very unpredictable, and Canadians have turned to renovating their houses and it was a need in very many areas. It used to be that it was cheaper to build a new house than renovate, but that's not true anymore.

In a way, this decision of homeowners is good for the country. It rejuvenates old sections of cities where houses were really neglected, and it also provides jobs for people in the construction business. Construction companies have turned to renovation and new companies are also formed to work on renovation.

There's a problem of manpower, materials and techniques. Repairs and retrofit means more a labour-intensive industry for many contractors, and requires different skills and also different levels of skills. Skills and energy-related projects, such as installing insulation and special windows when these storm windows are greatly in demand, and renovation inside and outside is being done all over Canada.

There are lots of complaints again from consumers. This is how we know what is going on, and if people are satisfied with the things they are buying. They are not satisfied many times with the work that is done. The contracts are not respected. Building materials are not up to standard, and CAC has to remind consumers that the most important thing is to shop for prices before they sign a contract and to make sure that they get a dollar value for their money.

The best advice that we can give consumers right now is to make sure when they will choose a contractor, to make sure that he's licenced by a contractor association or a contractor board of the government, where it is available, because the conditions are different in each province.

Make sure that your contractor's responsible and competent. This is something that these construction associations make sure of — that they are competent and able to give a good work, and that they are responsible, and this is something that is very important to consumers.

Getting two or three contractors even before you sign a contract, and writing on your contract the date that the work is to be terminated, is very important. We have seen cases where the contractor was busy. They take a lot of jobs and they sign the contract in the fall and if you don't have a date where you want the work terminated, they won't do the work until the next spring and maybe the next summer and you can run into next fall.

The brand name of equipment that is going to be used on the job, and the brand name of all the material that will be used and work and materials should be guaranteed.

The main concern of the CAC in the coming decade in the sector of renovation is high standards in home buildings and renovations, the development of new warranty programs to meet the needs of renewed housing. We have a warranty program on new homes that works very well and people are happier about it, but we need a kind of a warranty program for the needs of renewed housing. We need review and improvement to existing warranty programs in housing; greater initiative in the fields of research and training of workers, leadership from the industry in introducing energy-efficient standards and technology to both the new and existing housing, more and better communication with consumers from the construction association, and more advertising for people to know where to go when they have problems and to settle the different problems.

There is a job to do information on what services they have available, and so we count on these associations to help people, but we also do our part and we do a lot of information. We hold seminars and reunions at the local levels for people in each area to get the information.

Another of our concerns is recycling, and that's part of energy saving. There's more to saving energy than just changing your heating system in your house in order to use less oil, so in relation to housing, we can, for instance, stop over-heating your house.

We do overheat our homes, and that's a well-known fact today, and we are thinking about it and you can also stop using such appliances as solar lamps that take a lot of energy.

We can avoid to light our homes needlessly. You hear a lot about that. Just put the light out when you leave the room. You can avoid waste by recycling paper, cartons, plastic, aluminum, rubber, glass, metals.

We are a wasting society. We waste so much of our energy, it's unbelievable, and we have to think along these lines. It's not for later, it's for now, and you can buy containers that are returnables. These are the little things we have heard for quite a while, but they are important.

The CAC has for a long time convinced it's members that they must stop wasting our resources and convince our municipal governments also to organize ways of collecting paper, rubber, glass, plastics, aluminum, and sell them back to companies for recycling.

Volunteer groups have proven that this is possible. They used to say, "Oh, you just can't do it, you can't get any money out of it, and if it doesn't bring any money, it's just not important", but it's the wasting that we do and we have to really think about this and it's coming very soon.

The big job will be to convince the municipalities to do that. There are groups already that are collecting these things and you have to be careful not to stop these groups. You want this to be co-ordinated in a very good way, so this is what we are doing.

It takes years before you get to co-ordinate these things, but we are getting there and this will be a way for a few Canadians to earn a living.

We have groups that are doing very well in the west region of Montreal. One of our objectives in CAC is to convince the municipal authorities that this wasting of our resources must end. It's urgent that we take this decision and this direction in order to conserve our energy.

QUESTION: It seems to me that the chief incentive to save energy is to save money.

QUESTIONS & ANSWERS

QUESTION: Consumers Gas in Southern Ontario has been charging homeowners and developers a contribution for reduced income to the gas company caused by energy savings such as upgraded insulation. I find this rather discouraging because the strongest argument of the federal government is that it is going to save the homeowner money. I get the feeling Consumers Gas Co. makes sure that we don't save any money.

MS. BRISEBOIS: I guess if you want to encourage people to go into something, you will tell them that you will save money, but [illegible] don't think it's really saving money. Ottawa gives you $800 and it's a taxable grant, and then you have to provide the rest of the money to do the rest of the work. Maybe you do save money in the long run if your bill is going to be lower, but it may take five, six, or seven years before you do save that money, and it's going to be on the long term.

QUESTION: I'd like to feel that the consumers association is watching this — someone should be. Every time the Consumers Gas Co., for instance, asks for an increase, it has to go through all the levels of government, but it's strictly a formality. This year, for instance, in Toronto all the equal billing rates were increased 25 percent. You could do nothing about it. The gas company has decided that we're all going to pay 25 percent more this winter regardless of what efforts we've made to retrofit or re-insulate our homes.

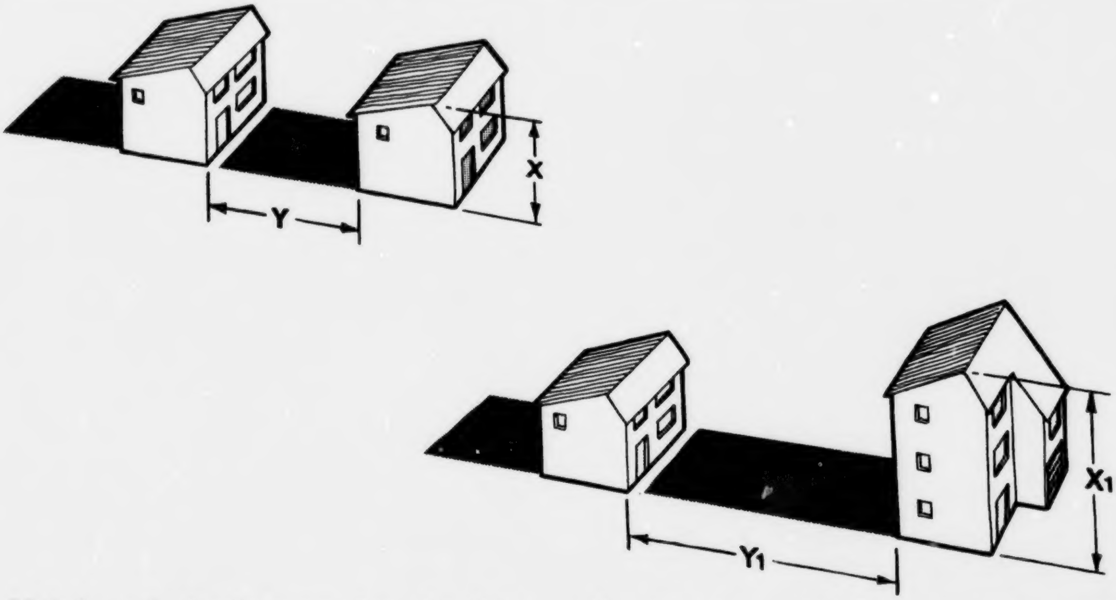
MS. BRISEBOIS: The Consumers Association goes to all these hearings and we always have a good representation there, but I must tell you if you go to the Bell Canada hearing, for instance, they have something like 10 or 15 lawyers working for them, and when we go to these places we're lucky if we have one lawyer with us.

QUESTION: The Ministry of Energy in conjunction with the Association of Counties and Regions of Ontario, which is, of course, a municipal association, has established joint steering energy conservation committees. They have energy co-ordinators that work within ACRO, and 135 municipalities have energy co-ordinators in their municipalities. They have also had about 20 seminars on energy conservation.

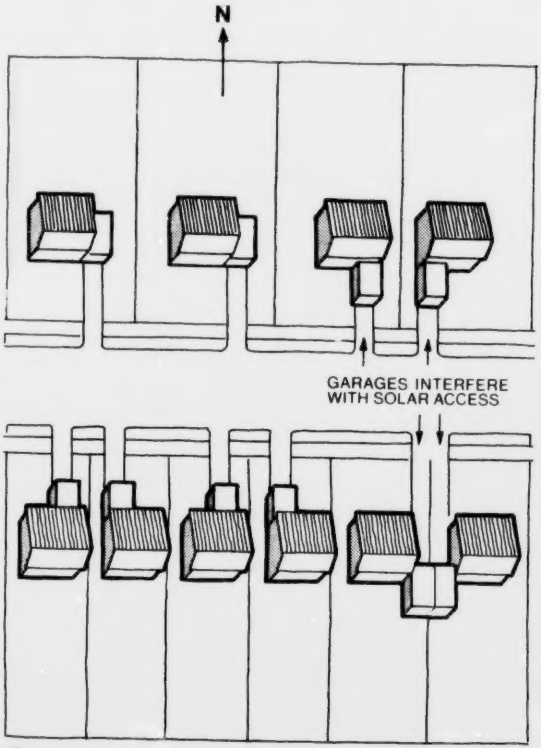
QUESTION: I am with the Ottawa-Carleton Regional Housing Authority, and I have to make a lot of decisions and following the decisions I have a lot of fights to get the money to do the things I want to do. What I've learned through bitter experience is that there are no gifts. When people talk about $800 from the government, it's not a gift. We pay the taxes to get it and then once we've got it we pay taxes again so that at the end there's damn little in the way of a gift. I don't believe in gifts from governments myself.

The main thing I wanted to say is that to me energy conservation or conservation of any kind has to be financially sound and, if it's not sound, then I think it's a waste of the taxpayers money. There's no point in installing an energy-conservation device that is going to cost you $3,000 if you're going to save $200 a year with it.

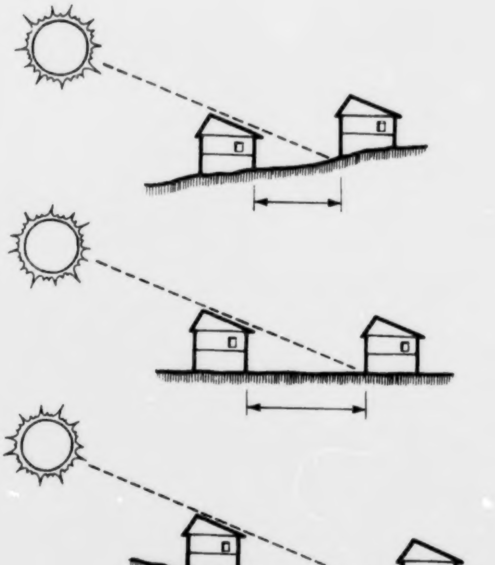
MS. BRISEBOIS: It's true, we have to be careful. I think all these programs that are brought forward like this are really something to start your economy going again. Even in the housing sector, in 1973, when Ottawa gave aid to people who were buying their first house, this is something that will make people start buying housing again. Then construction will start again. I'm not against it because we need the homes.



Height of shadow-casting dwelling influences the necessary separation distance to neighboring buildings to the north.


N
GARAGES INTERFERE WITH SOLAR ACCESS

Garage placement should not interfere with south wall access to the sun.



Effect of slope on shadow length.

Section F

DESIGNING CONSERVATION

16 Saving Energy Through Site Design And Community Planning

John Donahee:
Professor, Landscape Architecture, University of Toronto.

The theme of this session focuses on the realizable potential that exists for saving energy. There are many dimensions to the saving of energy through community planning and design. Some manipulations of siting can be directly traced to enery saving. For instance, orientation for solar or wind production can be traced to quantifiable potential gains. Other aspects, such as transportation or mixed land use are exceedingly difficult to precisely model since the influence of variables such as proximity of residence to workplace are nearly impossible to deal with at any specific level for the consultant. Therefore, we will focus today on those aspects which have in our practice produced definitive results.

Very few people have had the opportunity to apply the principles of energy saving insight design. The panelists have had a base of experience in its incorporation with the planning process and what will be presented to you will be some facts pertaining to implementation. In comparing our collective experiences for this session, we identified a conviction which we all hold. The conviction is that there is a great need for interaction between what are often segregated participants whose planning domains are seldom overlapped. In this we refer to such relationships as the interface between the builder and engineer or a landscape architect, an architect or engineer. If the potential for saving energy is to be realized, then we must look beyond the simple technical potential of our singular professional ideas and focus on the net impact of them on a developer, builder, municipality or consumer. Some actions to save energy will involve little or no trade-off to any of the participants in the process. On the other hand, some methods of saving energy may be technically quite simple for the development industry or planning department to implement. An example of this might be the general raising of densities.

This type of action has been shown to corelate closely with general energy savings. Such a move though would involve a profound trade-off of the strong cultural and market preferences of people for single family home life styles in the case of residential development. There are options for the consumer and as long as they have some limited scope of choice in the market place, an effort of this sort to increase density dramatically may be faced with resistance, particularly in light of the fact that the identificable potential yearly savings are not likely to exceed a fraction of the interest costs for even one month of the mortgage.

I caution people to rigorously examine the implications of their ideas. Even under favourable conditions, it has been a slow process for all of us to convince clients that the efforts can be painless. If the details are carefully monitored and related to the motivations of each of the participants, without a perceptual linkage between the technique and profit, those who take responsibility for the expenditure will be at best reluctant.

The first thing I'll go through is an energy assessment of a plan of subdivision. In this case, it's identifying the kinds of savings that can result. We have, first, an analysis of the solar shading patterns from existing vegetation off the site and existing vegetation on the site prior to development. We identified that maybe 30 percent of the unit had reasonable solar access in this development. I use as an example we went through a process of redesigning the whole sub-division and were able to get closer to 90 percent solar access but the real gains came in,the fact that we saved 700 feet of roadway and added four extra lots to the development which more than paid for any consulting fees.

The second case I would like to illustrate is essentially the problem that can arise in interpretation of some of the shadow analysis things and the need for interdisciplinary work. As a landscape architect, I do a shadow analysis indentifying a slight overlap of shadows on units. In this example it means that the shadow is coming about two feet up on the side of the house, well below any windows and it is happening at a time of the year that the problem would be very minimal. So it is difficult in interpretation and if a planning department had a requirement that you could have no overlap whatsoever, it might unduly compromise a project. In this particular case, it's an example of an existing plan of subdivision; a developer had a passive solar house and wanted to know which sites were suitable for that particular type of unit. I'll now hand over the presentation at this point to Greg Ross who will carry on with more dealing with the relationship of consulting

Gregory Ross:
A principal of Enerplan, Toronto, Mr. Ross is a planner specializing in energy conservation issues.

We are planning of course today for land use developments that will remain functional and viable well into the future. As we are all aware of course, we are certainly developing and approving sub-divisions and housing developments today that are obsolete from an energy perspective. The basic planning principles that we were trained in, it is interesting to note, are totally complimentary to energy conservation. We've always been talking about mass transportation, about higher forms of residential development. Although I don't mean by that to suggest for an moment that's all we are talking about in terms of residential development, highly complimentary principles in relation to energy conservation, the tools and the enabling rights are certainly at our disposal. There is no point at all in excusing the lack of implementation or progress in terms of energy conservation in our daily planning function because we don't feel that the tools are here — the information is available or the enabling rights are at our disposal. Upon very quick examination, one can certainly discover that all that is necessary is certainly available.

I think one of the problems with the role of the planner is knowing precisely what it is he or she is trying to achieve before actually implementing guidelines or official plan policies or zoning by-laws. Certainly the problem is one of accuracy, not lack of information. In other words, we must be real. The planner who might advocate underground housing, for example, will not succeed in the objective of conserving energy, certainly not in the short run, or the planner who is advocating only medium and high density residential development for the sake of energy conservation also will run into severe difficulties. These things sound perhaps a little bit unnecessary but it's been my experience that they are happening. At this point perhaps I should mention that it is very important that the planner understand the role of the builder, more important today than ever before perhaps. It's well within the realm and the capability of the builder today to design and construct low energy housing. To what degree is a very contentious issue perhaps but it can be done in low density housing. For example, we have been demonstrating across the country, that single family detached houses can be built that heat for $100.00 a year for example and they represent 2,000 sq. ft. of space or more. We are certainly not going to move out of the single family market tomorrow, let alone today — not totally anyway.

I think it is important of course as well that the planner have a reasonably good understanding of the market place. The planner doesn't directly interact with the market place but in persuing the objective of conserving energy through his or her relationship with the development, the consultant, the builder, the planner must have a pretty fair idea about the market place and how the builder must contend with that market I think that the planner has a tremendous opportunity to be an advocate, which is a fairly exciting role to play, well within the realm or the preview of standard planning practice. By interacting with the developer and the builder, the planner can be many things, certainly by passing out information, communicating ideas, the planner can act as a marketer for low energy housing.

My experience is the development and building industry would certainly welcome this kind of participation from the local planners. Education is another common thread between the three major roles — planner, developer, builder. Nobody particularly likes to educate. Education takes time and money and other things and it's not really directly within the preview perhaps of any one of these particular role players. It is more within the role of the planner perhaps than the developer or the builder or so it's perceived. But let's not kid anyone. Everyone has a responsibility to educate to some extent or another. It depends upon how you interpret the word 'educate'. The planner can directly educate through public meetings, policy papers, announcing official plan amendments, zoning by-laws, any opportunity at all to communicate with the public. There's always an opportunity to introduce energy conservation principles and so on and also to identify the role of the developer and the builder in the local community.

To move to the developer for a moment; the developer has to be concerned about the future as well as the present and the astute builders today, or the astute developers I should say, are certainly looking at energy conservation. That is an irrefutable fact. They have no choice. None of us do. Bearing that in mind, there's no time like now; if you are not already involved in advocating energy conservation, those of you who are involved in planning, certainly there is every opportunity to make advances now. The developer has a very, very important role in terms of the end result, in terms of what the builder will do. The developer provides the foundation for the builder. The development that is processed and approved that is conventional design for example is giving the builder a more difficult plan to work with in terms of conserving energy and selling the product. A solar plan may offer 15 to 20 percent energy saving just by virtue of orientation and solar access. Simple. The builder then of course is already beginning with a bonus. He already has conserved 20 percent over conventional housing. Without this advantage, the builder then has to invest more time and more money and perhaps involve more sophisticated techniques in building technology and design considerations to overcome the disadvantage of conventional planning. By virture of solar orientation, by that we mean orienting the lots more or less north/south, developer then is passing on a better plan to the builder and thereby is involved in educating the builder.

I have recently gone through an experience where there was a transition from a developer to a builder of a solar plan. The developer was somewhat reluctant to inform the builder as to what his was about. It was a nice looking plan but it was a solar plan. The builder perhaps wasn't astute as he should have been and did not ask the questions, well why is this more? Why has this got not a curvaling or road pattern but more of grid pattern? By the time this plan was registered and those who were involved with architectural control, the builder was bewildered and the problems that ensued were totally unnecessary. The objective of energy conservation that was initiated with the planners in this particular case would have been much more successful in the end but this is where the developer/builder communication broke down. Perhaps in retrospect it may have been important for those local planners to have involved builders as they had the development industry earlier on in the development of their guidelines and policies and zoning by-laws and so on pertaining to energy conservation. The builder of course produces the consumer product and deals with that group called the market place and, of course, today, with high interest rates it's very difficult to convince the builder that there should be more costs incurred by him in producing his consumer product when the consumer already is having extreme difficulties in scraping together the necessary monies to purchase his product. We've also experienced this recently. My solution — reduce the size of your home. That might be a good idea. We are talking about 2200 sq. ft. homes — I don't think that is necessarily a wise move. Perhaps we should reduce the size of your homes for a start but let's not chuck out the energy features that were incorporated into the design and construction of the units.

Mortgage lenders have an incredibly important role to play in this whole area of energy conserving housing simply by introducing the energy factor into the mortgage calculation with low energy housing. By that move alone, one can retain a market that would have been there for the cheaper house and make that home more viable for the home buyer as time goes on. You see in simple terms in an energy conserving house, it's not the amount you are paying out in mortgage and energy — and instead of looking at it that way per month, look at how much disposable income is left over after all the bills are paid. By buying, let's say for example, a $70,0000 home — maybe it's more like a $100,000 today — conventional home. You add $5,000 to that house and you make it energy conserving and it's now costing $200.00 or less a year to heat that home. When you combine the energy factor and the normal principal, interest and taxes payment, even at 20 percent interest, its not long before you are breaking even. It's probably within two years using those figures that you are breaking even on your monthly payments. Certainly as energy costs continue to rises, the disposable income for the person or the people who bought that low energy house will increase while the disposable income for those who bought the non-conserving house will decrease. It's that simple. The builder, in other words, could be tremendously assisted by the financial industry. We are not just talking about energy and financing we are talking about real improvements in home comfort, another major marketing aspect of low energy housing. We have better natural daylighting in the winter months. We've got natural cooling in the summer to the exclusion of the necessity of air-conditioning for example. And of course, we have a draft free home, these are things that people really would like to have.

Now, in terms of the building concept, I would just like to put out to the audience that the basic components in a low energy — I won't say passive solar house — consist really of insulation, air tightness and ventilation and humidity control. These are the components that will give you most cost effective result. For example, take a very successful passive solar, low energy house in Regina, Sask. that heats for under $100 a year. Now the incremental costs when this was built was about two years ago was close to $10,000 but the industry today can produce that same house for probably half that. As I say, it heats for under $100 a year. Also in Saskatchewan, perhaps the best Canadian example of low energy, passive solar housing and planning, bringing the planning and development and the builder components together is in Saskatoon where a particular street was developed as part of a demonstration program — an east/west street, north/south lots, 14 different builders, 14 different style homes — all of them low energy passive solar houses. They look like conventional houses but, of course, they save, in this case, 80-90 percent of the energy over conventional housing. I will just end by saying that knowledge on the part of the planner, the developer, the builder and good communications among the three should lead to an expedient, cost effective result in terms of persuit of conserving energy.

Blandford Gates:
An architect and partner in Fleiss Gates McGowan and Caston, an architectural firm in Toronto.

My topic is the Mississauga City Center Energy Study. The study was funded by the Ministry of Energy of Ontario, the city of Mississauga and the region of Peel. I had three clients. The study team consisted of the firms of Henry Fleiss and Partners, architects and planners.

Mechanical/Electrical Engineers, Delcan — Traffic Engineers and Morrison Herschfield, Thiekson and Rowan who gave special consultation to us on enviromental impact and control of wind. The study was conducted under a steering commmittee which consisted of members of the staff of the Ministry of Energy, the city of Mississauga, the region of Peel and, very, very important, a member of the development community of the city of Mississauga. After all the findings, the recommendations will impinge most directly on the people who eventually have to build, own and operate the City Centre of Mississauga.

The study was restricted to the City Centre as defined in the the secondary plan of the city of Mississauga. That was determined by amendment 281 of the City of Mississauga. The study time frame was for 25 years and, in 1980, when the study was commissioned, that would take us to 2005 so I'm four years out of phase with this particular gathering but you will have to bear with me.

The functions that would be housed within the city centre entailed a component of residental: 25 percent of the floor eare would be devoted to residential uses: 50 percent of the floor area would be devoted to office components, and 20 percent to retail and about 2 percent to civic and 6 percent to hotel space. It was deemed an opportune time to investigate the energy consumption that would be inherent in such a diverse range of uses over a 25 year span.

I think it's important to know that, on completion, the Mississauga City Centre will have a floor area of 2.4 million sq. meters, that's equivalent to virtually having 24 Square Ones shopping plazas appear in Mississauga City Centre. We were charged with the investigation of what areas of planning could be modified to improve energy consumption, what areas of building design or form could be modified, what could be addressed in the areas of systems to energize the buildings, which could be modified and what techniques of construction could be suggested to improve the tightness energy consumption of the building. We looked at the implications of improving the pedestrian enviroment because the centre does rely on quite an extensive network of pathways and walkways between buildings inter-connecting with blocks and to park spaces beyond the centre. It was deemed if you've walked through Mississauga or in the City Centre area as it currently is, it can be quite a windswept place. The merchants, politicans and citizens of that area are certainly aware of that problem and wish to address it. I suppose, in answer to O.W. Mitchell, we have seen the wind and we have attempted to draw it and it is illustrated in our document. The document I am referring to in this address of course is the study itself which is available from the Ministry of Energy and I believe now available through the Government Bookstore. It's amply illustrated with diagrams to demonstrate techniques of controlling the wind and how you can use it positively and how to avoid it's negative impacts.

Okay, we defined the area, we defined the amount of space and the function. We then applied to those floor areas and uses energy consumption budgets. With those budgets and the floor areas, we determined energy consumption. The next role that we had to fulfill as consultants was to then make recommendations to our clients on methods of energizing or bringing to that space heat and cooling in an energy saving way.

Before you can define what is energy saving, we had to first indicate what the costs would be to heat for instance 2.4 million square meters of space conventionally using individual boilers in each building block, those boilers being fed by gas. We accounted for the capitalization of all the boilers for the 2.4 square meters of space. The staffing of those boilers, maintenance of the boilers and fuel consumption over 25 years, heated conventionally meant the bill over 25 years would be $80 million dollars. I was impressed with that figure. We then said there must be another way of energizing this with heat and we investigated a central or district heating system. Remember this study is very site-specific to the secondary plan of the City of Mississauga. The plan lends itself through heating through district systems because it is a simple grid system and it has a density ranging from a low of .5, in floor area ratio on its outer fringe rising through a floor area ration of 3.6 at its core, with an average, over the 178 hectares, of something over a floor area of 2. so it's a fairly dense and urban development that's proposed for the City Centre area.

Now, taking those considerations, it was appropriate to consider heating Mississauga City Centre with district heating and the savings were really quite rewarding. By the same considerations, capitalization, maintenance, staffing and fuel costs over 25 year period, the savings were in the order of 20 percent instead of $80 million it dropped back to $64 million. At the same time you were saving fuel as well as energy.

The same approach was taken to cooling and individual cooling for those buildings over the same 25 year period and costs would have been something in the order of $48 million. Using a central chilling system and piping cold water to all of the uses, it dropped down to 32 million, a savings of some 35 percent.

What's so interesting about Mississauga City Centre? Only 10 percent of the space that will be there is there now so there is an opportunity to tune and build the next 90 percent in energy efficient way. We dealt with some modifiers, taking a sort of macro scale of how to heat it. We said we can make further savings and that can be achieved through the fine tuning of each individual building, the building systems, and the fabric of the building and how it's constructed by virtue of an efficient form of the building. In one which would reduce the skin exposed to the elements, up to 10 percent savings could be achieved. By virtue of putting heat storage tanks in the buildings 20 percent could be saved, and on and on. The study dealt with the number of these modifying issues but the main thrust is that the Centre is a prime example of something that should be heated and cooled through a district system.

In conducting the study, of course, the solar componets had to be addressed, and one of the first issues that we looked at was the orientation of buildings which was influenced very markedly by the street pattern. It just so happens that the proposed fixed street pattern is approximately 45 of the cardinal ordinance of east and west, so in order to address the sun, one would have to make rather curious relationships to the streets and the sidewalks surrounding them.

That could not be done. However, we calculated that 40 percent of the roof area of the build centre would be available and useful to the placement of solar panels. Our study came to quick stop in that area after calculating that the cost of panels, in 1980 anyway, for that 40 percent of the roof area in the centre available to us would have been something in the order of $100 million. That's just for the hardware not accounting for maintenance and staffing of the facilities. Obviously, there's no fuel input but the $100 million at this time didn't seem to make sense persuing the facts for solar much further.

Recycling in such a large community has many rewards. Even if one just tries to recover the paper and cardboard that is generated by the completed Mississagua City Centre, it would give an income on completion of something in the order of $400,000 in 1980 dollars. That would be, I'm sure, inflated many times in the future and that was only assuming that one could collect something in the order of 50 percent of the newsprint that would be consumed by the City Centre and its citizens, 35 percent of the fine paper that would be generated in the office components, and only 20 percent of the cardboard that would be generated in the shopping component of Mississauga City Centre.

The transportation components were difficult to address as most of the methods of saving energy on transportation lie with the Federal Government and policy statements and energy charges and taxes and with the province and not with the municipality of the region. However, a number of recommendations were made relating to parking standards, parking sizes and the encouragement of the use of vans and pooling of cars.

The study was presented on October 21 to the City of Mississauga General Committee of Council. It has been approved and now the staff of the City of Mississauga are charged with the responsibility of advising Council as to the implementation methods to see that the studies recommendations are followed through.

I think the most important recommendation in the study is the thorniest because the construction management and management of a central or district system is somewhat problematical in Ontario or Canada indeed at this time. The questions are: would it be public utility? However, we've overcome these problems in the past with Hydro and Bell Telephone and we'll be able to overcome that in the future. It's been done in Scandinavia and there's no reason why we can't cope with it here.

I think, in closing, the study has proven to us that it is a worthwhile venture to do for any community at an early stage, prior even to the secondary plan stage, to investigate what implications that plan has on energy consumption and how the plan might be modified to improve it.

Rob Wright:
Landplan Collaborative, Guelph. He and his company are currently preparing an energy masterplan for the City of Guelph.

What I'd like to do today is probably to destroy some myths about energy conservation and to create a few more. I titled the talk The Built Landscape: terrible assumptions and beautiful lies. The reason why I did that is that as a landscape architect it's hard to fail planting flowers. You really can insult a lot of people, I mean trees and the landscape and everything is usually a beautiful thing. We like to think of ourselves as champions of the cause of environment, esthetics, parks, playgrounds and all that sort of stuff. I'd like today to be able to prove to you that the landscape has a very functional aspect to it. It has a role to play in energy conservation.

I would also like to challenge you on the fact that energy conservation is an environmental issue. All my graduate students that come to me now come to me with the same topics they did five years ago. The only difference is they put energy on the front of it. If it was social playgrounds or something like that, it was energy and social playgrounds. If is was utility management, it was energy and utility management. So I started to look at these things and I found that words like ecology and environmentare now being swept aside and we have the word 'energy' in its place.

An old Prof of mine, Jack Wright, who is now the head director of school planning at the University of Ottawa, once told me a story about a piano player who was doing a concert someplace like Carnegie Hall — he was playing the piano away and a fire broke out and of course, everybody went into a panic. The piano player saw this and said, all right, what I'm going to do is that I'll go back to my seat and I'll keep playing the piano. He went back to his sea, started playing the piano and the people saw that, were relieved, went back to their seats, acted very calmly and they all burned to death. Energy conservation is something like that. We have the initial panic and then we become very cynical about it and now we're about ready to burn to death.

The question is where will we be, as this conference suggests, in the year 2001? A man from Hydro whom I talked to, most aptly put it, we're running foward, looking backward and tripping over every new idea that comes on the market and that's really where I see ourselves today.

Landscape planning and energy conservation as I said before, are environmental issues. You just have to walk around in the built landscape and ask yourself how are these things impacting energy, how does energy get used in all of this stuff?. In this environment we look around at the practices that we right now. If we made just what we did more efficient in terms of the things that we do, be able to save energy without inconveniencing everybody.

I always laugh when we try to make solar housing look like conventional housing. Who in the hell likes conventional housing? Is that what people really want? We say we want to give the people what they want. Is that really what they want? Do they want Mississauga, high rise dwellings and that sort of thing. I don't know. Again, I'm not coming to you with answers today. I'm coming to you with questions.

Everybody wants to give you answers. I look at things in the landscape, the streetscape there on your left, a little Etobicoke creek there on your right in Mississagua, and I say, what were the energy costs for these? What can we do? What will be the energy costs in the future? I think they're very interesting questions. An issue that we can talk about later is that we took the City of Mississauga — it demands 2-1/2" calibre trees, about $150 a piece — we convinced them to use 1" calibre trees and we were able to plant about five times as many trees. Potentially, maybe the area will be a woodlot some day, or just a forest in the middle of the city. We're monitoring these things, we don't know. I'll be quite honest with you. We don't know what's going to happen. We're trying to find out. We're starting to share information among professionals. I'm always impressed when I go down to the States. I go to another consultant and the guy says, here is the other report we did, and I'm going why are you giving this to me, I may turn around and take your job from you, and they say, no, because we don't do the same thing twice. We would like to do an original project each time. Now that may be their sales pitch but it's kind of a nice feeling. I hope that government and in private consultancy we can do the same sort of things. The slide to the left is Williamsburg, it's a door closing device which I really get off on. You just open the door and the door closes itself with that cannonball. We just don't have the cannonballs we used to. On the right here we have a group of citizens who have gotten together and are planting their own landscape evergreens, trees, they've gotten together as a group and they're starting to do it. I still maintain the garden as a symbol is a very important one for our society. You can look at the garden — we don't have to have gardens but we do. We have to have shelter, we have to have houses, we have to have food, we don't have to have gardens yet man strives to create gardens and that's a very philosophical question. I'm now going to talk a little bit about some of the programming stuff that I went through both from my thesis to my practicing professional years now. Again, we have the man there with climate control built in and again we have the little Etobicoke creek with some natural systems planning. We have the types of practices that are taking place, the way we handle our streets — that's noise attenuation fencing — that's the big issue right now with most municipality poeple. We're now turning every street in North America into the 401. We're going to put concrete walls, we're going to put steel down the side and eventually, when energy conservation becomes an issue, we'll rip those down and put up solar panels and then who knows what. They'll discover that they'll be able to make energy from hydrogen. We'll be able to have as much energy as we want and two years from now we'll all be back here with the problems of too much energy. Goals and objectives. Good question, what are they? I often say to people that we're dealing with both professionally and in the schools, summarize for me in one sentence exactly what you want. It's a very difficult thing to do. I've taken — I've access to 2,000 periodicals and I'm summarizing some of the recommendations and compare how many are the same, how many are different. How different are the American studies from the Canadian studies? That's an interesting point. You have here solar sub-divisions. I'm not against solar sub-divisions. My question is, do you want them? Is that how you want your sub-divisions to look? That's a question you have to answer yourself. They don't all have to look like that. I realize that, but is that what you want. We really love tools and techniques. We really get into them. They are important. They give you confidence to deal with an issue. Are they the only issue? Again, like I said before I worked with Frank Theikson for a while and I did my thesis on wind and energy conservation. I started to model things. I took a couple of books in design for energy conservation. I took all the rules and guidelines out of them and I said what happens if I test them — are they true? We're all supposed to be looking for some sort of truth. I took little models of solar homes, I took models of sites, I put them in the water flume, and I ran snow and wind. I used a hot water anemometer around them. I tried to find out, do they work? I can sum it up in one word, no. They all work in theory. They're correct in theory. They are wrong in application, because every application is different. You can't take a guideline for a wall out of one book and put it down on the landscape in Scarborough and put it down on the landscape in Mississauga without bringing that context and putting it down at the same time. If you do you're in trouble. I started to model clusters. I started to put them together. I started to ask the questions, do two buildings in front of each other actually hate each other. We all accept that is true, but do they? I started to look at the model in all its perspectives. I was looking at multiple dwelling houses, you know where everybody says higher density, so I started to look at the implications of parking away from your house and having to walk to your house and that sort of thing. I've changed quite a few of my ideas by just listening to the marketing people. Then I started to say, how do we know it works? What gives you the confidence when somebody hands you are report and says, Okay, check this out, here's a solar subdivision. How do you know it's any good. Have you seen the BTU's that they've saved. Have you seen the poeple that are a lot happier with these solar sub-divisions? We have to test. We have nothing else to do. For example, these are my little models and you'll see here I've got the typical solar home, small bum into the wind, solar face outwards, started to notice a whole bunch of things about that. First of all, when the wind came from a direction other than north, the wind swept around the front of the glass face of the building and would probably rob all the heat away from it. I put fences around all the buildings to protect them from the snow and the wind. You can see we have the wind coming at the building from that direction and the fence does not work. I started to worry and said. Hey, there's something wrong with the flume. There was nothing wrong with the flume. It has to do with the way we plan and translate these things into the built environment. I started to look, you know model in different directions. The wind is very dynamic. It just doesn't come in one direction, it doesn't come northwest in Canada. If fact, I don't think it ever comes northwest at all anymore now that I go through all the environmental services, yet we all take that as gospel. We all say that it's true. Here's the building sheltering the other building. Well you can see the scouring pattens in between the two buildings. How come? Is it because the buildings are off-set? The thing is that the turbulence is so dynamic that anything — the sort of cumulative effect of building — what will happen is you'll do two things and they'll be perfectly right. You'll throw in a parking building on the left and it will destroy everything else you've done. Everything that I did for energy conservation's sake, made the site worse. Okay. Because I was looking at each individual guideline and not at the sub-division as a whole. I started to do this cumulative thing, houses as single units, housing as cluster units, housing in different configurations, housing with landscape planning, housing with site design features, etc., etc. Then I started to test it. This is where I took the hot wire anemometer and started running around the thing and testing what was the velocity changes in the wind if we looked at wind alone.

We also looked at solar but I'll talk about wind because nobody ever talks about the wind. The sun only shines for about 8 hours in the winter time and the wind blows about 24 hours a day in Canada — usually at the average windspeed of 15 miles an hour all the way up to 30 miles an hour. Anytime I wonder about the wind I walk down Bay Street and there's no sun there and people can't even walk on the streets any more. That gives you an idea of the scale of the model. I then started to compile the results of these and each time I did it told me more about it. I know that all of you can't model but the one thing modelling does, it makes your judgment more correct. These are some of the die studies that we did to see wind actually moves around trees and buildings. The nice subtle little drawings with the arrows that flip over the thing, it's not true, it's a three-dimensional object — you can't show it on two-dimensional paper. It starts to do all these weird things — it starts to curl, see how it catches the fence in that one corner and whips by that. In one place you'll be measuring the velocity of the wind coming at the model and then you put the anemometer down and you measure how relative has it increased or decreased from that and some of them were like 10 times higher in some places and then it would stop altogether. You can see where the die has settled. The little myths about covering 10 times the height of the wind break you get that protection, it's not true either. It just doesn't work, because the trees are so dynamic, what height, what thickness, what density, what type. All these things — I'm trying not to be depressing. But, the question is, you have ask these questions. I've tried to look in the Guelph study, what we're trying to do — the guideline is don't use guidelines. Unless you're willing to look at them very carefully and look at them in the context you want to use them in, and unless you're willing to look at your sub-division and start to begin to monitor it — to look at it all the time. We've got all these people in this wonderful conference doing all these wonderful things and none of us can exchange enough ideas that we can come back and evaluate this. It's not so nice when people come and say, well I really blew it last time, we're supposed to be 80 efficient and it's only 25 efficient. We neen to know that. My little receipe is this. You have to be in the energy conservation field — you have to be flexible. You've got to be imaginative. Don't take verbatim everything you read. Every man and his dog is writing a book on solar energy right now. Of the 2,000 books I had to access to, I would say less than 10 are really relevant. You've got to go through those and find out what they are. It's an excercise in itself. Use your own existing base in your own community as a starting point. In Guelph, we're trying to do consumption models. What's the use in saying solar housing is the way to go if in your community, all it sells is estate housing, all that people do is to commute to Toronto. Perhaps reducing road lengths by 100' is more important than all the solar houses in your total community. Maybe the market won't support solar homes. You've got to do these consumption models to find out. Where consumption in you community has been in the past, where it is now, and your best shot as to where it will be in the future. You have to involve the developers, you have to involve the consultants, you have to involve your own staff. The other thing is that you carefully define your approach and get as many people to criticize it as possible. When you do you approach try to — and this comes from a lot of San Diego studies — try to do an energy flow chart — try to go through that thing and chart the energy flows through your community and most important, the inter-relationships of those energy flows, because those inter-relationships are the ones that will kill you. It's when you say the engineering standards shall be changed and The Planning Act doesn't give you that right or the engineering department is going to shoot you down before you start. The other thing is to really prioritize your objectives. Say to yourself, if I had to do one thing what would it be, then what would the next thing be, what was the third, fourth, and fifth and really go after that one thing. Target your objectives. Make sure your're going after the right thing and the other thing is when you're fininshed the study, prioritize again to see if you would still pick that same priority. The last thing is in this flexibility part, put you planning documents ion binders, so you can take it apart and add stuff and take things. out. It's kind of like plea bargaining in the courts. I think what we've seen in the States is a lot more inter-relationships between developers, consultants and planners because tomorrow the whole ballgame could be changed and you're going to have to realize that and you're going to have to go with it. We're going to have to develop a system whereby when something changes you can go back to your planning system and revitalize that without throwing the baby out with the bath water. In the last thing I'd like to do and I'm probably over my time, but I'd like to say this one thing, what I'm trying to do right now and if anybody is interested I'd ask you to please talk to me afterwards, I'm trying to develop and I'll borrow from the Anglican Church, excuse me, a communion of soul. I'm trying to get people that are interested in sharing information whether it be a consultant, a wino, planner, engineer or whatever, if you want to get into sort of an information exchange and yet work on energy conservation, get these studies out to each other, get them back, have somebody you can phone without having to get a bill the next day, or somebody you can honestly crit the type of work you're doing, and we're trying to set that up through the University of Guelph. I'd like to get a committment from you people today to share your experiences with each other, I know I sound like an evangelist now, and to try and work on something like this network, so that we can develop an evaluation base and we can honestly start to judge some of these landscape and site design issues and with that I'll end up. The last thing is never take yourself too seriously. I've learned enough. My sister gave me this next saying and she's always right — when I'm in my high spot, she always hits me with something like this — I'll leave you with that and thank you very much.

Vladimir Matus:
Manager of Energy and Urban Design of the Local Planning Division of the Region of Hamilton Wentworth.

The first indication that we were running into energy problems came about 15 years or so ago from the academic community and they were not taken very seriously. However, in our planning department, about 1977, we decided that we could not ignore our energy issues anymore. We produced our first report on energy conservation which was called Energy Consideration and Urban Regional Planning. We issued about 200 copies and we are still printing it as, in spite of the age, it's still a readable report.

Over the years we have accumulated a lot of interesting experiences, mostly in discovering how little our community is interested in our energy message. Over the years we found that if we want to change the situation at all, we probably would have to start a grass root approach and that was the inspiration behind our second report which is called Planning for Low Density of Solar Approach. We have found, also, that without proper understanding on the part of the planners and on the part of the community, we probably will be talking in circles. We really cannot make any breakthrough. So when we published the report we also prepared a presentation which was to inform the public of what we are really after. Our presentation includes a travelling exhibit. The first exhibit is basically a sun dial which as two interesting points: sun rise and sun set on two days of the years, and those extreme situations, the longest day of the year and the shortest, December 21 and June 21. This is the dial which you can use for a very practical purpose. You can take a model of a house and you can insert it in the center of that rosette. By this simple device you can turn it and you can show quite precisely the consequences of what would happen if your house is turned towards south, east, west, north in terms of how the sun and the house relate. Usually we show by flashlight when we dim the lights how the sun goes over, what type of shadow it's casting on the house and what happens at sun set. You can repeat the exercise for any position. Sometimes a simple turn could make a lot of saving. This is a very good exercise, not only for those who are planning or designing a house, but also for those who want to renovate a house, change the landscaping, make extensions or for those who are in the market for the house because it could influence the selection of the house.

This is the sky dome: we prepared it for demonstration purposes in a dark colour. Here we have the sun in June and December. There is an opening which allows the sun in between 9 and 3 o'clock which many researchers believe is the most important time. This is a very important tool for planners. If you start to design sub-divisions and layout of the streets and if you want to use solar energy, you have to have in mind this opening of the sky for the whole area or for the individual house. You theoretically can build such a house and measure those points if in that area there is any obstruction of any man made or natural object which would reduce the access to the sun. A planner or architect can see solar access easily providing that he has some means of drawing shadows of man made or natural objects.

Our next task was to develop a tool for drawing composite shadows. It's a set of templates for every month. You simply put it over the drawing and by very simple and easy computation you can draw the shadow.

For the planner, particularly, it would be a great advantage if we can have some kind of blanked provision where we can cover a particular situation. If we are researching one house and doing some unique desgin, then drawing the shadow of the object on the house is important because we are landscaping, placing the private pool and so on. That's very important but for the planner we also need a broader measure. We researched that and we came to the concept of envelopes. An envelope is a section through an imaginery structure. This is the angle of the sun at 12:00 in December and you can calculate how far the shadow will go. If this is a building this high, and we have another building here, the sun would appear at 12:00 right on this point. Then, if this would be, say, a northeast street, you can impose envelopes and whatever is built within this imaginery space would have a precisely predictable impact on the structures behind. We have those envelopes in our zoning by-laws.

Those envelopes have an advantage because, if you have a basic system in our zoning by-laws, you can describe them and everybody involved in the construction industry and planning understands those terms.

Those envelopes are something we try to introduce in our sub-division planning. What is good practice though, to pursue any utilization of solar energy, is to construct what we call an echo chart which is a sort of a portrait of the area. It's basically a dynamic profile of the particular area so we have a temperature variation, amount of sunshine available, amount of clouds which reduce the amount of sunshine available, degree heating and so on.

17 Design For Climate

John Page:
Professor in Environmental Studies at York University.

For many years, zoning codes and planning regulations have been the whipping post for many of the community development failures that have appeared over the land. Whether or not fault has been the make-up or the way of applying controls in buildings, can be debated without much profit.

There is an example which I can recall which is worth taking note of. It was a typical opportunity for development of a new town for a new mining operation which promised a reasonable long life. It was tied to the construction of the Hudson's Bay Railway which was being pushed through in the 1920's to give Winnipeg and the Prairie Provinces access to the port of Churchill on Hudson's Bay. I received the account a few years ago from Mr. Hobbs who is now in his mid-90's, who was the first Comptroller of town planning in Manitoba. Given the climate and the isolation of the proposed new town of Flin Flon, Hobbs urged serious thinking of building tower structures, something in the order of 10 or 12 storeys and surrounding them with lower strucures for the various service activities that the population needed. The proposal was turned down, as we all realize, but the challenge still remains today in similar circumstances. It was not the town planning act of Manitoba that prevented the innovation as one might expect. It was rather too much change, too soon.

We forget how far behind we are in building innovation and need for dramatic experimentation. That is why I have chosen tonight to introduce some of Ian McCard's thoughts and practice on these matters. Looking back over a half century and the unlimited variety of community settlements that have sprung up over the borial zone of Canada, two thirds of the land surface of our country, there has been little innovation to indicate we understand enough about the borial zone and its climate. As the days shorten, even in temperate Toronto, we are reminded that the northern latitudes of Canada speak of short winter days. When we consider the work hours of the miners, we ask, why is it that working time is not carried out in the dark hours instead of the sunlight hours when the days are so short? There is an abundance of sunlight awaiting our use, even in our northern settlements, if we all can only alter our thinking about the options which are open to use.

The energy shortage around the world reminds us how much sunlight and energy there really is available. Can we approach the design of our houses, shops and other work places and other community buildings with some basic new principle? How can we cluster our work and recreation? What care should we take to enhance rather than disfigure our environments? Above all, what care can we take from the outset to deal with the tailings and effluence of the mining and pulp processing activities that characterize so many of these settlements?

It was not the town planning act in Manitoba which constrained thinking about the new town of Flin Flon 50 years ago. Actually, the planning act allowed for any kind of realistic innovation at that time. Perhaps it was really the upset which stems from too much innovation at one time. We are more conservative than we realize in our investments and our community designs. Marshall McLuhan told me one time in drafting out a new book one must not put more than 10 percent new material in it or you will lose your reader.

It is partly for this reason that I've chosen to remind you of the work of Ian McCard whose book "Design with Nature" is now well known around the world. The three word title is to be taken very seriously. Each word means much. Design must be a competent effort to fit together the many complex aspects of nature, whether it's landscape architect, planner architect, developer or builder, the design work has to be done with as much knowledge as possible, whether for a small park area in a city or the routing of a new freeway or a vast region embracing cities and small towns. Whatever the extent, McCard insisted that sound ecological knowledge be used to give expression to human efforts to improve the habitability of some patch on this planet.

According to Ken Hare and Morley Thomas, authors of "Climate Canada", Canada's climate is a unique and paradoxical set of phenomena which calls to mind a favorite story of mine. Some years ago, a colleague of mine, who had been living in New Orleans for many years, took advantage of an opportunity to come to Canada for a year as a visiting professor. As the fall days shortened and the air grew crisper and then cold, he was shocked out of his senses when he experienced this neverending cold that persisted even after Christmas. The snow and cold remained on into April and despite a few heat waves he realized even in May there could be frost that would kill off a young tobacco crop overnight. When trying to give expression to both his feelings and sense of the dramatic, he wrote one day, "There are four seasons in Canada: winter, pre-winter, post winter and next winter."

In the Hare-Thomas book, it is interesting to discover there is now a known basis for ever threatening cold weather across Canada. The complex array of jet streams and water bodies, mountain ranges,prairies, ice caps and vast Pacific Ocean, are only recently understood. What my friend said about four seasons in a sense is correct. A too theoretical approach to Canadian climate, especially the winter dimensions, can easily overlook the fact that latitudes are not very helpful in deciding on community building design and construction. The indication that there are four winter seasons does have more truth than poetry in it. The unexpected weather events that make the forecasters look like $3 bills are doomed to error with the present limits of knowledge about the variables interacting to produce the weather on any given day.

The possible combinations make it not unrealistic to expect, from time to time, snow in early June in the western prairies. For persons involved in some aspect of building the environment, there is the question, will it happen this summer? It would seem to be correct to say that the possibilities of repetitions of unexpected weather happenings is very small. Practically, what the facts about climate tell us is that standard geographical clarifications of the terrain of Canada can be misleading, if not appreciated in their living dimensions. While a specific latitude may suggest a uniformed condition, in fact, it does not. Many settlements and regions may share a common latitude reading but have vastly different weather conditions. To carry a set of plans from one end of the country to another because of latitude similarity could be very poor practice.

All this urges us to take seriously the concern of McCard on gathering the vast amount of information about the eco-sytem in which one is attempting to make changes for the sake of improving habitability in some parts of our country. There is the problem of cost, especially with uncertainty of outcome. The task is monstrous when one considers the vastness of Canada's land and water territories. It is not just acid rain that is an atmospheric problem that is pressing for attention. If we learn about and take seriously the variability of the Canadian winter climate of four seasons, we have to take a quick look at the new variables coming on weather maps.

If, instead of a growing petro-chemical industry in the Sarnia area, we develop an even larger one in Alberta; if we think hard about the impacts of steaming out the tar sands of Alberta and the kind of effluence mixing into the atmosphere in western Canada, what can we expect downstream over the prairies and into eastern Canada? We are having many conflicts which are variants of the atmospheric pollution problem. The debate about waste from our large cities being used downstream, without treatment by other settlements, is a horror story of it's own. Yet decison makers have no qualms about delaying investigations into what is happening and how it needs to be dealt with. Calgary today, Niagara River yesterday, Montreal, Three Rivers next and so on.

Until a few years ago, when I had the opportunity to visit China, much of what I have referred to was feeling like dry dust in my mind and altogether too theoretical. But in China where vast, but not huge, development has taken place, the lessons to be learned abound throughout the land. The new kind of development has been tagged 'agropolitan' meaning there is a continuing merger of urban and countryside development. When we speak of China, we have to tell ourselves we are looking at one quarter of the whole world population. How did they manage to get around some of the basic problems of human living? Above all, with so large a population, how did they succeed in avoiding pollution in the handling of waste? While we must not think of China as any Utopia, nevertheless some account has to be given of how they dealt with McCard's emphasis on human co-operation and biological partnership, which nicely spells out there were real revolutions going on in China.

Paradoxically, there is apparently no word in popular language for 'ecology' in China. From early school days, the concept of waste and the values associated with it are taught in school. Part of the life struggle is coming to appreciate the four wastes. Waste material is waste gas, waste water, waste heat. There is an ethic of non-waste. In other words, recycle, reuse; profit is not done away with but it is lowered in value ranking by the people. Instruction and experience have taught that it is more profitable in the long run to reuse and recycle.

It seems that the whole account of the revolution and the resources that have been used derive from the harsh conditions they lived in at one time. The whole industrial, agricultural and development model took on the characteristics which only were brought out today in an account of the changes and economics in Europe that are coming on line. The vision of Shoemaker that 'small is beautiful' is taking on new considerations.

Arnie Fullerton:
Architect, Community Pathfinders, B.C.

In dealing with the north, what we have been doing almost unquestioningly is leap frogging southern development farther north. We haven't rethought it. If you go through the north, you will see almost no innovative solutions. It's quite incredible for me to go to Fort MacMurray and to really think it through and what I see is probably the most expensive city that we could ever build in the north.

In 1979, a small group of us started to rethink the problem of climate moderators in the north. We had worked with it at the inspiration of Ralph Erskine while we were in school in the late 50's. I think there are three major things that inspired me to pursue a project that I am going to describe to you.One is Indian dwellings that were built in natural climate moderators in caves that sheltered the high summer sun out and allowed the low winter sun in. Another project that inspired me was the 'Arctic City' concept. The third project was my own house I just finished building which was a passive solar heated house. It is a two storey greenhouse that we live in and nowhere have I gone in the northern latitudes and found people that wouldn't like to live adjacent to or even in a two storey greenhouse. We then developed this rather simple notion of enclosing a large area. We started with 100 acres and we have ended up down to 35. We asked ourselves, what were all the questions we would have to answer if we were going to build one of these. The initial sketch showed a combination of a town centre and living accommodation, perhaps transition living accommodation for people until they decided whether they wanted to stay and what kind of a house they wanted to buy or build around it.

We then took our sketch to the Alberta government and asked two or three agencies if they would be interested in pursuing it just in terms of a feasibility study with no specific site, recognizing there's a lot of development coming up in northern Alberta and there will be lots of new towns and expanded communities and the rate of development will be such that a lot of people will have to be housed rather quickly. The feasibility study they agreed to allow me to organize involved looking at four options for downtown areas we could compare, an open street plan, a regional shopping centre concept with housing attached, an incremental tent solution and a one large, air-supported structure solution and what I am going to describe to you tonight is the air support solution only.

It wasn't until one year on into the development of this large, 35 acre structure, that I actually got a feeling for the size of the space because it's beyond most of our experiences. After many model studies, looking at the two alternatives related to the fabric structures, the tent structures and the air supported structures, we narrowed it down to two. One was an incremental tent solution that we called The Sun Catcher. It could be built in roughly one to two acre sizes and attached one to another and grow forever if you wanted it to. The other was a large air structure.

We then tried in different places. We have an overlay of 27, 35, and 50 acre sizes on top of three different communities because we were all trying to relate to scale. In the simplest terms, the structure that we came up with was an elliptical form. We had a rigid structure around the edges, a tubular steel framework with a toughened or glass cladding.

We tried to determine what kind of temperature moderation we could get out of just using the amount of heat that we would normally use or the amount of energy we would normally use if these buildings were outside so that we could then define whether we got below freezing or not. The interesting thing we arrived at was that we could keep it above freezing with the normal energy requirements of the new Alberta standards, which would then allow us to grow a garden the year round. The other interesting thing is that we discovered cladding that is transparent, that has a life time of up to 100 years and that is fire proof, which means, in fact, that you can see the sky through the membranes. You can see what's happening outside and the climate outside but it would never go below freezing and wouldn't go, with our ventilation set up, above 30 centigrade. Of course, the spring and fall would be greatly extended.

The whole interior is like a southward facing bowl with housing stacking up and then we get the larger recreational facilities and some parking and storage underneath. As we move down into the streets that run east and west and down into a shopping environment, that in fact is a controlled environment at 68 year-round, it's like your suburban shopping mall. Basically it's all a one and two storey development with all of the roof tops being usable for outdoor living space.

The surrounding structure with the glass surface is 90 feet high and then the membrane roof rises off that. We brought about 15 disciplines into this study, two were sociologists, one was a psychologist, one was a perception person and we had the cultural anthroplologist and the psychologist. The more we got into it, the more we realized basically we were dealing with technology and we were saying, we have, we think, proven that it's feasible at a reasonable cost to build this type of a structure. We looked at a lot of the perceptual problems. We looked at quite a few of the psychological problems — we looked at a lot of the physiological problems and we didn't find anything that we could say to ourselves would make this any worse than Fort McMurray. What you have to recognize is that Fort McMurray is pretty bad. Fort McMurray has a lot of problems and the problems are that not many people want to go there. They get an unusual share of people who are social rejects from other communities and what the mining companies, the oil sands companies and people interested in making communities are finding out is that they are going to have to attract a far, higher quality of people to the north if they are going to make it work. When they start to add up the attrition rates, the costs to the industry, the costs to the community, management in terms of attrition and the social costs and my friend has added in his own subjective values for the human cost, the total cost is more than the energy you would get out of the ground up there, or more than the resource you are extracting. What it said to us is that it needs a real rethink. We arrived at the point where we have the technology but we then said, basically to our client, we don't think you should build it unless you deal with all of the other aspects in a new way which includes the political structure of the community: it includes the economics of the community: it includes the social implications and social attitudes and the world view of people. It means you have to treat it like an experiment and a very serious one. Everybody who comes there has to come to participate in the experiment and they have to be a democratic part of that experiment.

David Geiger:
A partner in Geiger Berger Associates and an international engineering consultant as well as adjunct professor at the Columbia School of Architecture.

What I really want to get across is that technology that may, at this point, appear like a dream, is in fact, here and now. It's a question of applying it in the far north.

In 1972, we did a study for the U.S. government on an 8,000 foot diameter structure covering 900 acres. That's a mile and a half across, free span. In this study, we envisioned cable cars actually hung from the roof. Once you close out the environment,you can then go to much lighter weight, less expensive construction of housing, etc., inside because, in actual fact, you don't have to deal with wind forces, you don't have to deal with weatherproofing. People can live on their balconies overlooking green spaces, work on their terraces, sleep out on their terraces where, outside of this enclosed city, you may be having terrible winds and snowstorms or a blizzard.

The technology was first envisioned in 1972 with this project. Later, for the U.S. government, we did a study on a smaller scale for the General Services Administration for an office complex in Denver, Colorado that was 400 feet across and 1,000 feet long. The people would actually be working on their terraces, at their typewriters, desks, etc., overlooking a park-like environment.

The major impetus for this project was using transparent membranes in a way that the roof became a solar collector. We have all this solar energy, a great form of energy, all around us but the trouble with it is it's so diffuse,it's hard to collect. Well, if we use the roof of our structures — the roofs that keep out the rain as solar collectors, we can pick up this diffuse energy.

Here we were talking about the membrane as the top surface consisting of the highly transmissive or transparent part on one half and reflective-like, metalized sunglasses you can see through but metalized on the outside so it reflects most of the sun rays. Doing that in strips that run east-west so that the winter sun would come through the transparent parts of this structure the sun then would bake the ground, the platforms, the typewriters, filing cabinets, etc., and get absorbed. That would be your storage mechanism and would be a large part of the heating in this case in Denver, Colorado. In the summer time when you don't want that summer sun to bake everything because it would get intolerable in this greenhouse you've created, you just, by opening the valve and changing the pressure, flip that little membrane up, because it is a flexible membrane, it's capable of moving, and now the roof becomes fully reflective. In a very simple mechanism, we can change the thermo characteristics of the roof. This is what we call 'a thermally active roof'.

There are many variants and various ways of doing this but, when we are talking about covered cities in the future, we are talking about roofs that will act as solar collectors when we want them to be solar collectors, act as surfaces that will reject heat in the summer when we want to reject the heat. By collapsing roof skins, pushing the lower membrane up as well, reducing the insulated value in the summer night sky, you actually use a cooling effect of the night sky. Those of you who have been on a desert realize that because of the low moisture content in the air, you can actually get frost on the top of your sleeping bag in the middle of the desert at night. This is from the night radiation as a cooling mechanism. So we have the ability to heat and the ability to cool through the roof membrane by varying the characteristics and this is very important.

Let's look at the real buildings that have been built. We began with this technology in the construction of the United States Pavilion at Expo '70, in Osaka, Japan. This was the first application of the low profile air-supported roof ever built. Also there is a structural system that I obtained patents on in the United States and Canada and we have, since 1970, built a total of 13 of these. One of the major characteristics of the type of space created is the natural light and the fact that a shallow dome, a dome with very little rise, gives you a feeling of being outdoors. You actually have created a sky dome.

After 1970, we worked with Dupont and developed a permanent, incombustible fabric. This is a teflon coated fibreglass. Many of you know the product, teflon, from the frying pans you have in your kitchen. Very little sticks to teflon. It washes clean. This is in fact, how the Silver Dome in Pontiac, Mich. got it's name. After three years in the Greater Detroit environment with all the pollution, the roof still glistened as silver as the day it was born, as the day it was first made. This is true of the first roof that was built with teflon fiberglass in Los Angeles. It's as white today, eight years later, as the day it was first constructed. We are talking not only about membranes that will be transluscent or transparent but will stay transparent or transluscent. Acid rains will not affect it. We are dealing with a really high quality material, teflon, that is incombustible and self-cleaning but we are able to pay for that high quality material because, in the structures, we are buying little else than the material. We are just buying cables spanning the space. We are not paying for heavy concrete or steel beams or arches spanning the space.

We are attaching the fabric to cable and holding the total structure up with air pressure. Now you may say, well, wow, air pressure holding buildings up, is that reliable? If you really think about, you all got here this evening using four air pressured structures to carry you here, the tires on your car. When we are talking about air structurs covering acres or hundreds of acres the larger the space, the more reliable this structure becomes because of the tremendous volume of air trapped within the structure. The hole, the openings, becomes of no consequence as the structure gets larger. Again the natural light permits plant growth, permits the natural setting and the feeling, and this is the most important part, of being outdoors at sunrise and sunset, with clouds overhead, birds flying; all these things are mirrored inside the space yet you still don't have the rain or the cold or the winds.

How practical is this technology? We have recently completed shade structures using the same material in Saudi Arabia. This is a structure that covers 100 acres. As many as four million pilgrims will be camping out under this tent at a time on their way to Mecca. Most noteworthy of the structures, the one I think the general public knows best, is the Silver Dome in Pontiac, Mich. The structure covers 10 acres, the cable span 800 feet. It seats 80,000 people. It was completed four years ago for 51 million dollars, that's the total structure including the roof. We completed last year the Syracuse Stadium just 90 miles south of Montreal. It is a complete facility including the demoliton of the old Archibald Stadium and building out of the ground, a total, enclosed 50,000 seat stadium for $26 million. It's the cost of the crane rental in the construction of the Montreal Stadium.

One of the reasons why we are able to do these structures at such a low cost is you don't have much crane rental because when you are building the structure, it's conveniently very close to the ground. After it's completed, you inflate it and it goes up where you want it to be. The advantages of construction include speed of construction. This roof took two months to complete, just two months to build the roof because the components are prefabricated.

In this case, when you are talking about the far north and you are talking about a very short construction season, you see the tremendous advantage because you have the opportunity to make your enclosure and once you have your enclosure, you have, in fact, extended your construction season for the constructions inside to year-round. You want a method of construction of the shell, or the membrane roof in this case, that deals with large, prefabricated components that can be built off-site and very quickly assembled on-site and that is the method of construction that we have used successfully on these stadiums.

In South Dakota, we've done a total of six covered stadiums, have the seventh one in design. Three of these are collegiate facilities and three of these are professional facilities. Other professional facilities are the one in Pontiac, Mich., the Silver Dome; the new B.C. place, Ampha-theatre in Vancouver and the structure in Minneapolis, the Hubert H. Humphrey Metrodome which was just inflated about a month ago. Indianapolis is now beginning the construction of their domed facility, all of this in a short period of six years.

Let's go to Canada and Calgary. Here we have the Lindsay Park Aquatic Centre which we are beginning construction on. This was just approved by the Calgary Planning Commission. It includes three pools of 50 meters each, a competition pool, a diving pool and a recreation pool. On the other side of the structure is a 200 meter track with various basketball courts, tennis courts, etc. on the floor. Again, we have the plant growth inside. Because of the challenges of the north, we are dealing here with a roof that has an average R value of 20. This is equivalent to six inches of insulation as the average of the roof but, in addition, it has the translucency of 4 percent uniform, enough to have the kind of plant growth that you have seen in these other facilities.

I want to make the distinction. On these smaller structures, like the one at Lindsay Park, you want to combine the insulative value and the translucency when you build in the far north but when you get to the very large megastructures like we want to consider for covering cities in the north, you can deal with it from a different approach. For a moment, just think about why the earth and the moon, which are essentially both the same distance from the sun, have such different climates. On the moon, you have a temperature in the lunar night that goes from nearly absolute zero to plus 250F. On earth, your temperature extremes are from -60 to plus 115. Why that difference? The difference is essentially the environment, the atmosphere around the earth which moderates the climate of the earth whereas the moon does not have this atmosphere. Essentially what we are proposing is creating another atmospheric innerface, a membrane that further moderates the climate on earth so that the extremes of temperature in the far north that might go from -60 to plus 100, now can be moderated between temperatures from plus 40 and plus 80. This is the function then of a membrane and when you get to a very large structural system, like we are proposing for these enclosed cities, you have the natural storage effect of the city itself, being your storage reservoir holding the summer sun, the heat from the summer sun, and carrying it into the fall, extending your fall and winter season.

QUESTIONS & ANSWERS

QUESTION: One question about the roof. Do the snow loads affect the structures at all? In the high Arctic or far north would the snow load be a problem in design?

MR. GEIGER: The air supported roofs are designed so that the snow is melted. It can carry up to 12 lbs. per square foot of snow without melting the snow but the membrane is double skin and hot air is passed between to melt the snow. We are also looking at resistance wiring to do the same thing. The tension structures like the one you saw in Calgary which is not air supported but still uses the same membranes, do not require snow melt. In that case we can design the structure to carry whatever snow load that actually exists. The air structures have been, to date, designed for communities such as in South Dakota where we have up to 40 lbs. per square foot of snow loading. That's also the snow loading in Vancouver, B.C.

QUESTION: Are there any cities now that are close to being started as complete domes? Isn't there one somewhere up near Northern Alberta or is it still in the planning stages?

MR. GEIGER: The one I showed you is the only one I know of that was done for the Alberta government and it was done as a feasibility study. It's not built and they don't have a site and nobody intends to build it yet until they find a need for it. The costs were very interesting on this. The prototype compared to building, say Fort McMurray, over again, priced out by two different quantity surveying groups, was about a 30 percent premium on the capital cost, but you start to recover that very quickly on operating costs and if it has an affect on the attrition rates on things like that, you recover it very quickly then. That's also because it's a prototype. The quantity surveyors recognized if you had already built one and you were building a second one, maybe the cost would come down even lower than Fort McMurray. Fort McMurray and those kinds of cities, when you analyse them, are extremely expensive. In New York they are abandoning suburbs because they can't afford to maintain them or keep them up. Imagine the same kind of stuff in the far north if you're paying the same price to maintain them and for energy. They are very, very expensive so we need to look for new answers. This may be one but the reaction I've had over and over to this idea is one of fear if everybody had to lie in this kind of situation. You have to remember that the vast majority of the north is already one model with lots of problems attached and I think it's time we started to experiment.

QUESTION: My question is one about technology. I was wondering what would happen if a serious fire turned out in these domed structures. How would you handle that — would it be a disaster?

MR. GEIGER: The materials are essentially fireproof to start with and secondly, if a hole ever did burn through, they self-extinguish and then the air is moving out so in fact, the air puts out the flame. The structures done to date have included exhibition halls, B.C. Place, amphitheatres being used for that purpose. A new one in Indiannapolis also and so the questions of exhibition halls have a tremendous fuel content and these issues are solved with venting and control of paths of smoke which means you pressurize emergency exit areas, etc. You are talking about roof structures that are such a distance from a flame source that even if they weren't of incombustible materials, you would not have a problem. The material being used is incombustible. It will not propogate a flame and it will, at a certain point, self-vent.

QUESTION: I would like to ask another ventilation question. Are these bubble-type buildings ever going to be compatible with more than just a large building. That is, is it going to be able to cover up part of a city including roads and vehicles and polluting cars and such things.

MR. GEIGER: Technologically, the answer of that is, yes, but I don't think you'll see it for maybe 20 or 30 years.

QUESTION: I guess I'm finding one piece missing. I live now in a relatively cold climate. I live in Minneapolis. I spent the previous year living in North Carolina where I learned what the heat of the sun belt was all about and, prior to that, I lived in the northeast in Philadelphia and New York and spent some time in Montreal so I've lived in those different climates and seen people living both inside and outside and within that context. There's one piece that seems to be missing. I wonder if we are not talking too much in absolutes that the people who live within these climates or within these enclosed areas will be there from the day they walk in until the day they die. Nobody's talking about the possibility that when any of us probably want to go skiing, we don't ski in our backyard, we get in the car and we may go to an area where we have recreation. We don't necessarily have the ice skating rink in our backyard or down the street. We may have to go to it in whatever way. Isn't there an element that says, you may want to go outside of the dome for your recreation to commune with nature and what have you? Instead of leaving that part of it out totally which is what we seem to have been doing all night aren't some of those problems addressed by just the reality that you can leave the dome freely. You come home from work in the evening and you go out. You're rested. You didn't fight your way home through the snow. Is that a question that would be reasonable to address?

MODERATOR: EBERHARD ZEIDLER: I think it's a very reasonable question and I think perhaps it is also perhaps a very good point to terminate tonight's discussion. I don't think that we ever could come to a solution on a problem of that far reaching consequences. I was not responsible for selecting the panel but who did so, I think, did a very good job in trying to get various differing opinions and possibilities and questioning the issue because if we would all agree then we could not discuss these issues. I think that just because we can technically do it, is not sufficient reason to do it and I said that at the beginning but on the other hand, is it also not sufficient reason not to question and exploring it and I think that is really what has been done tonight and I think many of these that Ralph discussed I hope will give us thought to rethink how we deal with the issue. Many of the technical possibilities that David Geiger and Arnie pointed out do need further explorations and particularly in the light that our last speaker said, we have to look at a wider way at these things and we are willing or not willing necessarily to live in the way I grew up in a mountain village in which, during the winter, literally life ceased. You could not move any more and people lived below the snow. I think today, people would not like to live that way anymore while at one time it was a very romantic and wonderful way to live that way and I think with some nostalgic backing to my youth and yet you can't bring that youth back and unfortunately, the same happens to us in our technology. We are growing up in it. We have our memories. We can't destroy our memories but you also should not let our memories kill our future.

18 Making The Liveable Winter City

Rick Lawford:
Carbon Dioxide Advisor in the Canadian Climate Centre, Mr. Lawford is responsible for providing advice on the implications of carbon dioxide caused climate changes for Canada's energy policies and programs. A former meteorological instructor and researcher as well as a forecaster, Mr. Lawford has authored numerous articles and reports on climate and energy.

Canadian Climate Centre Canada has a unique and diverse, and oft times harsh climate, as I'm sure those of you who have tried to battle the Toronto winter winds have experienced and would agree with. I'm sure those of you who've tried shovelling out from a snowstorm will agree with that. I'm sure those of you who have experienced the flooding associated with some of the spring floods that we have here in Canada will agree that we have an oft times harsh climate. Those of you who tried to build in areas where we have heavy snow loads will also agree that we have a harsh climate here in Canada.

Let's look at some of the factors that are important when we describe the Canadian climate. When the temperature decreases below 15 degrees Celcius, there is a requirement for more and more heating. Heat losses increase linearly as the temperatures decrease. We also find that in the summertime we have conditions where the outside air temperatures increase and there's a requirement for some cooling of homes. In the wintertime we find that it's not only temperature that's a factor in terms of human comfort, but also the wind is important as well. And if you pick out a temperature of -20 degrees Celcius, you'll find that for a small increase in wind speed from 5 to 10 kilometres per hour, there's quite a significant increase in the amount of cooling that a body experiences when it's exposed to the wind. A number of other factors that are important too, as we consider the various components of the planning and designing of built environments to accomodate the climate that we experience. We have solar radiation as being an important factor. Air temperature is an important factor. Ground temperature is an important factor. Wind speed and direction are important. The rain, snow and humidity are also important factors.

We have talked about human comfort to some degree. We've also talked about energy use for cooling and heating requirements. There's also the design and the construction of buildings that are affected by these various climatic elements, and also the services that are provided in a municipality or, for a particular building, are affected by a number of these factors.

Let's look closer at some of the factors now that control Canada's climate. First of all, there's the latitude, the rotation of the earth, the reflectiveness of the earth's surface, which controls the amount of short wave radiation coming in from the sun that's reflected back to space and not used efficiently for the heating of the earth's surface. There's the proximity to oceans and there's the effects of mountains that modify the earth's climate.

And there are latitude effects, of course, we're all familiar with them. In the north, during the winter, we have very little incoming solar radiation at the northern latitudes, more at the southern latitudes. So the effect of latitude is linked to the amount of incoming solar radiation. The rotation of the earth results in a west to east circulation at the upper latitude, upper layers of the atmosphere and particularly at the mid latitudes. This, then, steers the low level synoptic patterns, the lows and highs that migrate across the map on a day to day basis. Albido is important because it determines how much of the incoming solar radiation is reflected back to space and of course, where you have a snow cover, you have a lot of the incoming solar radiation reflected back to space. So the sunlight is not effective in heating the earth's surface.

Looking at the topography of Canada, we find that there's a marked mountain chain on the west coast, the Rocky Mountains. This has a very significant controlling effect on the climate because the flow pattern is such that the air tends to be displaced northward as it moves over the mountains, and also as the air climbs over the mountains, the water content of the air is lessened because the water precipitates out. On the west coast, we have a lot of precipitation, but then the air, as it moves inland, is quite dry. So we have subsidence over Alberta and dry air over Saskatchewan and Manitoba. We also find that as a result of the displacement of the upper level flow pattern, due to the presence of the mountains, that cold air which forms and sits over the Arctic, is brought down from time to time over the central parts of Canada. And these cold outbreaks, particularly in the wintertime, lead to very cold temperatures on the prairie provinces. The east coast ocean has a modifying effect. There's quite a strong current up the east coast of the U.S. and this current, known as the Gulf Stream, brings warmer waters into fairly close proximity with the Canadian coast, particularly in the Maritime Provinces, not so much Newfoundland, but

Nova Scotia, and to a lesser extent, New Brunswick. The effect of this is that as air masses and storms move up the east coast, as they're very prone to do because of this circulation during the wintertime, they pick up a lot of moisture, and this moisture gets dumped out on the eastern parts of Canada.

Another factor is particularly where you're building close to an ocean or a water body, is the frequency of fog. That factor must also be built into the planning. In the Arctic, ice fog is a problem.

Now, let's look at some of the local effects that modify the specific environment that a building might be put in. We've been looking at the macro scale previous to this. We can consider the "heat island" effect. As we get more and more buildings, particularly in high concentrations, we find that there's a heat island that develops due to the emmissions of heat from the building and the storage of heat in those building materials from the daytime that's released at night.

Buildings also modify the air flow by causing more friction in the lower levels and slowing the wind down in the lowest levels of the atmosphere. However, when you're speaking of an individual building, particularly a tall one, in a city like Toronto, for example, where we have a large number of them, the winds around a building can be very uncomfortable. The reason for that is that as you go up in the atmosphere, the wind speeds increase, the presence of a building will deflect the stronger winds from above down to the surface level and will result in very strong winds around the building which are particularly uncomfortable if it's cold out.

Land — sea breeze effects are also contributors to the climate of a city like Toronto that's built on the water body. Now, let's consider Canada's climate in comparison to the climate of Europe. We heard of the ocean current earlier and how the Gulf Stream has a warming effect on the eastern coast. The Gulf Stream flows south of Newfoundland and up to the west of the Scandinavian countries. As a result of the presence of the Gulf Stream, the southern limit of polar ice is much further to the north in the vicinity of the Scandinavian countries. So Leningrad, which is a very northern port in Russia, can be used almost year round, even though it is at a very northern latitude, because of the modifying influence of this Gulf Stream.

We have pretty well permanent ice cover over the Hudson's Bay and around the coast of Greenland but when we get to similar latitudes over in Europe, we find that they're ice free and, in fact, sea surface temperatures are frequently at or above zero degrees Celcius.

While Canada has a north-south temperature gradient, in Europe, because of the modifying effects of the Atlantic Ocean and this Gulf Stream that we were looking at, there tends to be more of an east-west temperature gradient. We could ask ourselves some questions. If we were to find, in Europe, a climate that's comparable to a number of our Canadian locations, where would we have to go? For Vancouver, we make it down almost to the Mediterranean Ocean. For Toronto, we're at a location very close to Oslo, Norway, while for Montreal and Ottawa, we would have to go into northern Norway and into the mountainous areas. For the prairie cities, we pretty well have to go into the U.S.S.R. and, just to give you some feeling, Calgary is considerably east of where Moscow is. So, if you think that Moscow has a harsh climate, and we tend to think that way, many of our Canadian cities have a harsher climate.

There's not too much of the area of Canada that actually gets into a temperature range where air conditioning is required. By comparison, we might look at the temperature distribution for the month of January. The temperatures are very cold up in the Arctic and throughout central Canada. On the coast, where we have the influence of the oceans tending to warm the air, we have warmer temperatures, particularly in Vancouver, but also to a certain extent on the east coast. And then, we have the parts of southwestern Ontario that are quite mild as well due to trajectories of air masses that come in to southern Ontario. The temperature ranges between the mean daily temperature during the coldest month and the mean daily temperature during the warmest month, are really quite large. On this map, in the central parts, the temperature ranges are around 40 degrees Celcius between the warmest month and the coldest month.

That really gives quite a range of temperatures for someone who is trying to design the optimum building that will accomodate both the summer and the winter extremes. The heating requirements on the west coast, due to the effects of the mountains, tend to not be as large as they are at similar latitudes in the central part of the country.

Now, if we look at the precipitation pattern that Canada experiences, we get a map with heavy precipitation on the west coast, due to the mountains causing the moisture in the air to precipitate out, and then we also get heavy precipitation on the east coast although it doesn't compare with the amounts measured on the west coast. In central Canada, the provinces of Saskatchewan and Manitoba, it's quite dry, but we have a generally east-to-west gradient then, as we move through Ontario into Quebec, in terms of the amounts of precipitation. Looking at the days with precipitation, we also find that there are more days with precipitation on the west coast than on the east coast. Again, the influence of the Arctic air coming down from the almost desert-like conditions that we have up in our Arctic results in dry and sunny conditions on the prairies.

We have to be aware that while averages are all right, climate and weather are varying things, in designing, we have to use design temperatures and design precipitation amounts.

Looking at the wind, which is also a significant factor in designing buildings, particularly if one is estimating wind load, one finds that the winds are quite strong where you're close to a water surface, particularly close to an ocean. So we have strong winds on the west coast, strong winds on the east coast, and to a certain extent, strong winds on the prairies, while in southern Ontario the winds are lighter.

Freezing rain is also another factor that must be considered and is quite common in southern Ontario and southern Quebec.

Also, in the planning of cities, one has to consider the effects of air pollution, and the requirement to have sufficient wind to flush out the air pollution from time to time.

19 Underground Homes: Earth Shelters

Don Metz:
The author of the soon-to-be released book, "Superhouse," Mr. Metz has a Masters degree in architecture and has 90 buildings to his credit. He has designed 12 completed earth sheltered homes and was, in 1979, the founder of Earthtech. He lives in New Hampshire.

I'm an advocate not only of underground or earth sheltered buildings. I think what we've seen in the development of alternative technologies and energy efficient housing types in the last three or four years, is an emphasis towards the systemic approach. We hear about earth sheltered houses that are simply earth sheltered and super-insulated houses which are only super-insulated. But they are tools and not just systems.

There's no reason why an earth-sheltered house can't also include features of any other type of house. When we talk about single family houses, we are talking about site-specific houses — they have a variety of compelling components which will dictate how we are going to design that house on a particular site. And the size of the house, the budget, the kind of fuel that's availabe — all these kinds of things indicate tools rather than systems.

The earth-sheltered business was started for me in 1971 when I built an earth-sheltered house, for reasons that had very little to do with energy. Oil was 17¢ a gallon and I wasn't thinking about energy issues at that time. However, a year after OPEC, suddenly I was a pioneer because I had done this before.

I would be the first to say that the future of North America is not necessarily underground. But some of it will be, and there are some excellent applications. Most retail stores, auditoriums and theatres need no windows and buildings which don't need outside sight and light are naturals for earth-sheltered applications.

One myth of the earth-sheltered (partee) is that all you've got to do is stick a building in the ground and you'll be warm. Well ambient earth temperatures in many parts of the country range from the high 40s to the low 50s. That's not warm — it's low grade heat! Earth is not a good insulator, especially when it's wet, but it tends to be much warmer than outside ambient air in the winter.

By surrounding anything with a material like earth — it could be old tennis shoes or sandwiches (anything as long as there's enough of it to become a moderating environment) — it will be less cold. Or less hot. Earth ought to be thought about as a moderator, not as an insulator.

The earth sheltered tradition in North American goes back a long, long way. The American Indian dwelling, for example, is essentially a teepee with earth stacked on top. And sod huts — these buildings were built of sod, not because earth-sheltering was the trend but because no wood was available. The R-value of a foot of wet sod is probably less than 1, so they weren't built this way for insulation purposes.

Incidentally, here is a good example of why you should never believe owner testimonials as to energy efficiency — in 1971 I built a house on spec and sold it before it was finished. The people who bought the house would never tell me how much it cost to heat it and the standard line was, 'well, we always burn a fire every night, and you know how much heat goes up the chimney after the fire goes out'. Finally, I suppose it became unbearable, because I finally pried it out of them two years ago. This house was a disaster for heating. The reason was, when I built it, I put the equivalent of R4 on the roof and then I put earth on top. Now, if you don't believe that putting an earth building into the ground is going to be cold, I give you this building as evidence. What you have in the middle of winter is a foot-and-a-half of ice on the roof, essentially.

Last summer, we dug the roof up and added styrofoam over the water-proofing and it immediately cut the heating costs in half. The end walls are still probably R6 or R7, so that this house is not exemplary as far as energy efficiency goes.

The roof system above block walls is a yellow pine, six by ten, heavy timber system. Most of the houses I've done use heavy timbers for the roof system — not concrete like you'll see in most earth-sheltered houses. (The reason, is that most of them were built in areas where native timber was available at very economical, competitive prices.)

The decuine it is two by six, tongue-in-groove kilm-dried spruce. The carrying timber across there is, in fact, two six by six steel angles, back to back, and the bottom of the timbers sit on the bottom leg. That bears on, in this case, nothing more than two by four studs — there are about four of them. This roof is designed for a loading of 230 pounds per square foot which sounds like a lot of weight. A parking garage, for instance, is designed for 80 pounds per square foot. In fact, when we built this hoa to put the earth on the roof we had a tractor on it with no effect whatsoever that we could measure.

The plan is a very simple — what we call an elevational — and in this case, sort of linear circulation (a double-loaded corridor plan whereby the primary spaces are on the south side and the secondary spaces are on the back side).

The first earth tech house we did was built in the winter time. It's a 2000 square-foot, one storey rectangle, a fairly plain vanilla design which we development to provide an alternative to the great American ranch house.

To give you an idea of cost, we used six by ten green hemlock timbers which were air-dried on the truck en route from the mill. Every timber, plus all the two by six studs used for the bearing walls underneath, cost us a total of $1,800.00 in 1978. That, plus the decking which was another $1,800, plus the labour, turned out to add up to a roof system that cost us about $3.00 a square foot in place. That also means that we got a beautiful inside ceiling that's completely finished, and an additional R value. When you average out all those six by tens, you get an additonal R value of three to four points which you don't get with concrete. Plus, with spans under 16 feet, there's flexibility when it comes to a chimney or skylight or switching directions. Also, on a remote site where heavy equipment is not possible, all you need is two or three men to assemble it.

Because of the weather, we poured grade beams, put the walls on and finally closed it in. Then we poured the slabs. The interior bearing walls were built out of green hemlock (12" on centre). Then, after we got everything up, we cut doors where we needed them.

This particular roof is sloped 1/4" to a foot pitch, and it slopes from the front to a valley that's two-thirds of the way towards the back; then the back slopes down into that valley for the back third. It's a very simple, four-bay plan: two 14' bays in the middle and two 12' bays on each end. We used a tapered carpet on the roof edge, the idea being that frost on the roof might push a vertical parapet over, whereas here it will simply ride up the parapet.

Later, we realized that we didn't need to continue solid decking from the points of that blocking, out to the outer edge. In fact, there was no real reason to put that decking in, except for structural continuity.

All papers blocks will be covered with 3/4" plywood. The water-proofing is applied to plywood over the deck, and then the insulation is applied over that.

We don't always pitch roofs. But this one was pitched into a valley connected to a series of roof drains. We also put stone on top of the water-proof inks so that water could run laterally. In retrospect, I don't do that any more because when you consider what's happening on the roof, you find you already have a water-proofing membrane and a number of layers of styrofoam, and then earth. The amount of water that can run under the styrofoam is negligible because the earth is squeezing it down against the deck. There will be a very thin film of water between the water-proofing membrane on top of the deck and the first layer of styrofoam and between each successive layer of styrofoam. But most of the water that runs laterally is going to run on top of the top layer of styrofoam — there's simply no room for it to work in between the layers. We don't do that anymore.

One thing I can't stress enough is, if you are thinking about an earth-sheltered house, bear in mind that you need more dirt than you can imagine to put around the building. We've only done one building where we had enough material on the site. Normally it takes enormous quantities of earth to backfill around the house and the roof. One house, for instance, was 2,000 sq. ft. and there were 36 yds. of dump truck loads on the roof alone.

We don't do that anymore because, unless you create that space, there's very little water moving at that point anyway. It was a waste of money.

This house (on paper) picks up a fraction of its heating load from insulation on the south wall. I'm not sure how much energy it ultimately gets from that south wall, but that's what it looks like on paper. In any case, it's a deep 52'-long south wall, most of which is glass.

This house has baseboard heating which is under a raised step. The step is raised for two reasons: (1) to gracefully hide the baseboard heating, (2) to elevate a standard sliding glass door unit so your view isn't interrupted by that otherwise low window-head.

The wood stove goes up into a metal-asbestos chimney which is essentially a ready-made, insulated, double-walled metal pipe. When the stove is on, of course, there's no problem. When the stove has not been used, say for a 24-hour period, warm, moisture-laden air from the house finds its way into the stove. They're supposed to be super air-tight, but nothing is air-tight; Even the stove pipe isn't air tight. When warm, moisture-laden air gets into a stove pipe, it goes up the chimney, hits the cold inside surface of the metal chimney that goes through the roof and turns to frost. It builds up and, the next day when the sun comes out and warms the chimney, that same frost melts, comes back down or runs down the stove pipe and on to the top of the stove. We try to avoid that kind of situation — now we use masonry chimneys or a prefab (chimney) which we try to install on a side wall. Then we go out into a "T". The bottom of the T is perforated and sits in a gravel bed; then the T goes up from there. We use a stainless steel prefabricated chimney so that anything that goes up in that pipe will be drained down through the bottom of that T. It seems to work.

We built this house for $45 a square foot in 1978. That was the contractor's price — when he was finished.

Where there is a lot of rock, you may have to blast. Often a site is perfect except that it's full of ledge. We blasted for 3 or 4 houses and the average cost of blasting and clean-up was around $2,000. It's not an insurmountable problem but if you have on-site sewage disposal, it can be. In one particular case we had to pump up, and laterally, about 100 yards to the only area we could find for an on-site sewage disposal unit. The debris was all bulldozed out front and made a nice big, wide terrace on the downhill side of the house, the base for a terrace.

There's another inherent problem — it's often difficult to get anywhere near the downhill wall. In this situation you've got to tell the guy to stop long before the concrete gets to the bottom of the chute. Buried alive!

In one particular house we used styrofoam under the entire floor. That practise is debatable but, in this case, we went ahead anyway. The sequence is, the excavation is filled with a minimum of 8" of machine-compacted gravel. Then, a layer of 6-mil plastic is put down as a vapour barrier. Next, a layer of styrofoam is put down and over that, 6 x 6 — 1010 woven wire mesh. Finally screed rails are set up and concrete is screeded out, level, over the whole assembly.

There's also a stand-pipe of P.V.C. to accommodate a roof drain and some P.V.C. conduits which hold wiring from the main panel to various key locations in the house. With an exposed wood ceiling, you don't have an opportunity to snake those wires around, as you do in a conventional building, so we run them under the slab to key terminal points and wire through the walls from there.

Typical side walls in sites with terrific drainage — first of all, we make sure to patch all the snap-tie holes. Once the snap-ties are knocked off, there is a piece of wire that goes all around with a trowel and patches the end of the snap-tie holes so the entire wall is troweled. After that, a layer of black plastic roofing cement (which is a gooey viscous stuff that comes in a 5 gal. tub) is trowelled on, and, section by section, covered (while it's still slightly tacky) with 6 mil plastic. We often use black plastic because, for one reason or another, some of these jobs are exposed to sunlight for months at a time and the black polyethylene doesn't degrade as quickly as clear plastic. So, what you have is, that sequence of the trowelled-on black plastic cement; the 6-mil polyethylene pressed into it, then covered with 2" of styrofoam right up from the footing; and then, when we get up near the top, we will add an inch or two (to the 2" styrofoam). The closer we get to the surface, the more we insulate it.

This is a typical detail of any walk out place. We use 2' x 6' studs here, and we hang the shoe out 2". (We have 3-1/2" bearing on the concrete, although it hangs out 2" and the styrofoam butts right out underneath.) That's all caulked in and makes as tight a seal as you can possibly have. Then, we use either fibreglass or anodized aluminum to cover the top foot of the styrofoam so that, once it's graded against the building, you won't see the styrofoam and it won't be subject to damage. Then the sheeting comes down over the covering material, and the siding comes down over the sheeting, so it makes a nice tight joint at that critical spot.

The house proper is actually 2500 sq. ft., with an unheated utility building which takes care of large family's storage needs. Two other buildings are connected by a greenhouse which forms the entry to the house proper. The roof of this particular building was waterproofed with a product called bituthene, a rubberized asphalt material, which comes in a roll 3' wide and 60' long, and sticky on one side.

The roof looks a little odd. It's been primed with a companion primer to this product and has to dry for about an hour. It's just like a jesso on a canvas — it just fills in the holes, and we usually put this on double-lap. The finished product goes up and over papered cants. Sand is put on top of insulation that was placed on top of the water-proofing.

The whole idea of this somewhat modern roof assembly sequence is that the water-proofing membrane should be as close to the heated part of the building as possible. By putting it right on the deck and putting the closed cell water tight insulation above it, the water-proofing is not subject to thermal shock because it doesn't go through the thermal cycles an exposed roof does. (It will vary only 4 or 5 because it's right on top of the 2' x 6' decking which is as warm as the house is.)

This material has a sticky back and each roll sticks to the last, so once it's on you simply can't get it off. There is a definite advantage to a roof system which is fixed to the sub-strata. If you put on loosely laid sheet material, for instance, if a leak develops, water can go through the sheet, and then migrate laterally to who knows where. But when the material is stuck to the roof, if you get a leak, the leak is going to be where you see water coming out — the water can't move laterally.

There's a difference between the temperature of the material up at the top and at some point it's making quite an adjustment from cold to warm. But that hasn't been a problem.

The parapet in most of these houses is on the exposed side, and not on the sides connected with the earth proper.

One house has a barn-like building up above the greenhouse that attaches the house to the barn. The greenhouse is a 30'-wide building made up of tempered, sliding glass-door panels which add up to almost 13' on the diagonal, times 30' wide. It's essentially a storey or 2 storeys at the back, an average of a storey-and-a-half high, earth-tempered all along the back side and has no auxillary heat. It's on the coast of Maine and the temperature has never gone below 40. It's absolutely low-tech with no moving parts; nothing but inherent mass in it.

The entrance to the house is on the left — you actually can come in from the left and down the steps to the door. The steps were made from the leftover timbers from the roof (the 6' x 10' yellow pine.) This house is 2500 sq. ft. I think we calculated 75 0-degree days in Portland and the owner heated the house last winter with the equivalent of 3 cords of yellow pine scraps. That was all his heating, his hot water and some of the cooking.

There are timbers above the house in yellow pine. Yellow pine and douglas fir have about the same structural strength in bending around 1500 pounds p.s.i. If you have to choose between the two, one caution about yellow pine. Both yellow pine and oak and some other kinds of pine are hosts to blue stain. Blue stain is a little micro-organism that grows in the presence of water. The timbers have been cleaned up, but they were subjected to a lot of water and were once covered with black mould. Douglas fir does not do that, nor does hemloch. But yellow pine is very susceptible, so if you use it keep it dry.

There's a Franco-Belge wood stove in the kitchen with piping going up and over to a hot water heater. The stove gives them all their hot water and, at full capacity, is advertised to generate 60,000 B.T.U.'s, so they're getting radiant heating from the stove as well. It's extremely useful — for cooking, hot water, and heating about 40' of baseboard. It seems to be a pretty efficient unit.

My house in Lyme, N.H. is two-storeyed. The back walls, partially buried, are 10" or 12" concrete block, laid up in an arch. There's been no problems with them whatsoever. They were laid, then parged and then insulated on the outside below grade. Concrete would have absolutely prevented those curves and the block worked out to be very economical and very quick.

The floors in this house are double floors. The slab was poured and then 8" blocks were put in the spacers, steel decking put over that, and, then I poured another slab on top of the steel decking.

Hot air from a combination wood and oil fired furnace in the basement is pumped up through that cavity, which is a universal cavity under the floors, and then, air comes out at the perimeter of the house. The result is that the upper slab is isolated from the earth and from anything cold — a heat bank. There's about 25 tons worth of concrete there which is continually being washed by warm air from the furnace. It's the best place to have a thermal storage mass because all the floors are tiled. It's just in the right place. In the winter time you can run around on your bare feet on the tiles, which is a real luxury.

Under the brick is a concrete slab — a structural slab that spans 16' and is 10' wide, north to south. It's slightly pitched. We didn't really vibrate the concrete. We hit the forms with hammers the way you do it out in the country. It was probably 3,000 lb. concrete, not super-high compression concrete. The slab was poured and cured and eventually knocked the shoring out underneath; and we went ahead and worked on the rest of the house. It wasn't until the following spring when the house was all closed in and it rained and snowed many times that I eventually wondered, well what am I going to do with the slab? Meanwhile, there wasn't an ounce of waterproofing on that slab, nor was there a drop of water in the room below it. Now, I'm not saying concrete is the perfect waterproof material, but I do suggest that, when people say, my basement doesn't leak at all because of all that tar I put on the outside wall (most of the conventional foundation), they don't lie. They call it damp-proofing, not waterproofing. But most of that stuff is useless, absolutely useless. If the basement indeed does not leak, it's probably because the concrete was good and tight not because of that black cosmetic that gets put on.

So here was the slab, not terribly carefully done and completely waterproof. I put on some of that black stuff that you put on foundations to waterproof it and, then, I put bricks over that.

This is an opportunity just to mention esthetic possibilities of these buildings. I think it's encumbent upon us when we design this kind of building to use the fact that it is underground, and express it in some way. The experience should somehow be different from walking up to a door and opening a door not knowing what's behind it. You're led into this thing. As you approach the house you can see over it, down, at what is apparently the point of entry and, then, as you get to the front door you can actually see through the house: the arch, the tiled floor with the air space under it, and the two skylights which help balance the light.

The stove is as much for decoration as anything else — the furnace in the basement does most of the work. On 30-below nights, we usually get it going. The heat in the dining room, as in some of the other rooms, comes up under the kick-space under the bookshelf. In fact, it ought to come out under the window on top of the bookshelf! I wouldn't do it that way again — I would bring it up so that heat would wash the windows.

This is a good example of the myth of solar voodoo: the dark tile floor. People will kill to have a dark tile floor because they believe that somehow, dark tiled floor is magically going to soak up unspecified numbers of B.T.U.'s that are magically getting in the window, past the kitchen counter, the dining room table, the plants, the rugs, the cabinets. Somehow that south window is just pumping in B.T.U.'s, all of which are getting absorbed into that dark tiled floor. This is a good example of a place where, of course, it doesn't work at all. And I'd be cautious about going overboard on dark, tiled floors for that reason alone. There are plenty of other good reasons to use them but, in fact, that thermal storage mass often does not come up to snuff in reality.

Wing walls are not structural and in fact, they're simply an architectural device to bring the building down to the ground and to create separate spaces outside the house.

We use a thermo-brake — what Ray Sterling out at the underground space centre calls, thermo-nose bleed, to control. The lower wall (inside the house) is affected by temperatures inside the house. The little short wall to the outside is, of course, outside. The two, because they are made of material that is a good conductor should not touch, so we isolate the two with a layer of, in this case, urethane. Also, on the end wall there's a panel with silver foil on it. That panel has been cast into the wall to increase the length of the heat path that will go around the window. Some people want to break the wall up completely, just as we did and put insulation all the way up and down to make a complete brake but the facts of life on that are that, from the top of the highest point to the footing is about 11'. It's got earth pushing against the inside, back corner. And I think it's dangerous to interrupt the structural integrity (of that corner) so I'd prefer to cast it in the wall — not quite as good a brake, but it certainly maintains the structural integrity around that corner.

One site was a little bit wet so what we did was, we poured our grade beams (which you can barely see amongst the gravel) from a foot to a foot-and-a-half deep. Then we poured in washed 3/4" stone and put it on top of 4" perforated drain tile, so each bay has two rows of drain tile running the full length. The drain tiles then connect on the south wall and go down and through the wall. We also left sleeves in the south wall below grade, so that it wouldn't act as a dam to any water that might come up through hydrostatic pressure (into the middle of the building) and get trapped inside. Any water that comes up from below can either work into the drain tile or through the gravel, down into the excavation and out through a sleeve that was left cast in the wall. Any water that comes in contact with the building, will drop immediately down to a typical footing drain in a gravel bed and be carried off.

Another thing about water-proofing, our forms were particularly crummy — the contractor left most of the veneer stuck to the concrete. You have to scrape off all peeling pieces of the concrete before you get a good seal with water-proofing. Again, water-proofing, in this case, is best done by taking the real roof membrane right down over the edge, and right down to the footing.

This is the trick we developed for the heavy timber system to let blocking into the end of the timbers as they sit on top of a wall. One of the problems with exposed timber is, where the timbers rest on the top of a wall between adjoining rooms, it's very difficult to plaster or sheet-rock up between (the timbers), especially when they're going to shrink once they dry out. By routing a groove into each side of each end (of the timbers), we then drop a 1 x 10 right down into the groove. It's a very simple operation. It adds about 5 minutes to the preparation of each timber and it makes a nice neat detail which will never have a crack.

We also found out that you don't hook kitchen cabinets, for instance, to the bottom side of the timber. You let the timber move and put the cabinets on the wall and leave a space. Here's an example: you have a sheer wall on the back, just a block wall with some rebar and the cores giving us some lateral stability, in what is, in this case, a very long run. You need a partition wall there anyway, and for another $100 you can put in a block wall instead of a wood wall and get a lot of lateral support value from it.

There's a little skylight (timbered) morticed into the adjoining timbers. The headers are just morticed in about 1/2" and then, lag bolts hold them up. The wing wall, although it is a retaining wall, is not like a typical retaining wall which has 8' of dirt behind it and nothing in front of it.

The roof has a parapet on it. This one had a slope in it too so we didn't put drains in. What we did was, we ran a 4" footing drain right down the valley and off the far end, and we filled stone around it. It seemed to work. We've done them many different ways,and none of them have not worked. And so, I don't really know which one to recommend or not recommend.

Carlyle Rubber Company makes a product called 'bital rubber' (or E.P.D.M.), which comes in sheets. They also make pre-formed corners for just this kind of situation and I recommend them. In fact we're using them now with the bithutene. We put them on a pre-formed corner which has a flange coming off the roof from both sides, and a flange going up on both sides of the corner so it's all one piece. There's no pinhole to cause a leak.

Here's a section through the back side. There's a little over 1' of earth on the roof and another layer of styrofoam. In this particular case we add on three 2" layers of styrofoam, the joints lapped, one layer of single-play of bithutene under this and, then, another additional layer at the edge, just to go out and over the side wall insulation. On top of the bithutene we used a layer of 'bentinite', packaged by American Colloid Company, and the product name is called volclay panels. It's a 4'-square cardboard panel about 3/16's-of-an-inch thick, with flutes filled with this fine bentinite clay powder. When the bentinite gets wet, it swells up to about 30 times its original size and makes a kind of a gel, a thick gooey, nasty kind of oatmeal, all over the roof. In fact, it makes a nice combination with this bithutene. They both run about 50 a sq. ft., so for $1.00 a sq. ft. you've got a combination system which is tight enough, but if a pinhole or fissure should develop in the first layer, the bentinite will fill it or anything else that should interrupt that first membrane.

Stu Campbell wrote a book called the Underground House Book. At the end of the book he said, now I've found my site, I'm going to build one myself and this is what he built: a variation of some of the previous earth-tech houses. It has a kind of a greenhouse light-monitor and a slightly different configuration towards the back. To enter the house, you walk into the greenhouse and then down some steps to the right. There is a masonry chimney, a variation on a metal-asbestos chimney. He's got an extra panel over that skylight to help save heat. The decking was champered to allow the water-proofing to come down off the top and down onto the wall without taking it over a sharp 90 corner.

On the question of wood preservatives — if we have a leak we're going to see it. To preserve the wood would presume that we're going to have a leak and not see it, and it seems (especially with a 2 x 6) virtually impossible that we could have a leak and not see it — there's a joint every five inches. The tempers come together on the living room ceiling. There's a huge steel beam which we boxed in (which is not being completely straightforward), but under that is a 72 lb., foot-wide flange beam. In other words, it's very heavy. The fireplace is in a living room with glass doors and there's a jacuzzi with a skylight over — Yankee decadence.

This is a house down in Medfield, Mass. with quite a bit of steel on it. We used a board-acre of styrofoam on this house. (It's 44,000 sq. ft.) I only use the extruded polystyrene. Per dollar, per inch, per R — and taking into account that some of the expanded styrenes are not completely dependable — we decided to stick with the extruded styrenes and the urethanes. The isocyanurates do degrade, and, although you're paying for R-8 per inch, they can degrade up to 20 which means that you're talking about R-6 to 4. But even if you take the R-6 to 4 and look at it per dollar, or, per R, the extruded material is a much better buy. We use 1/2 inch urethane boards on the inside face of our back walls, because those walls tend to be cold. We then put on 1/2 thermax and one to three strapping ramset, right through the thermax, into the wall and, then, the finished wall. That's the only urethane we use.

This was a douglas fir deck. The columns are 3' sonatubes with an insert. Thermal-brake and foam go right down the middle, so there's essentially two 1/2 rounds separated by a layer of foam. The clear storey was 2 x 12's going laterally and, then, 2 x 6's or 2 x 8's on the side walls — 2' on centre — and it was just made up, piece by piece. It was a pain in the neck to frame: We used a synthetic plaster that's plastered right into a fibreglass mesh and makes a terrific, bullet-proof surface. It also, oddly enough, goes on over water-proof gypsum board. There's also Carlysle 60-mil E.P.D.M. roofing hanging over the edge. The roof on this building is essentially a big raincoat, loose-laid, despite my earlier remarks. It's the most expensive, and probably the best, roof you can buy for a sheltered underground building. It's essentially seamless once it's down, has an elasticity factor of 300, and is an all-around terrific material. It has the thickness and characteristics of a truck inner tube. Despite everything you read, when you get all through, it's between $4 and $5 a sq.ft. It sells for much less than that but unless you're real brave and want to do it yourself — the trouble is, it comes in a great big roll and it's heavy — you almost need a crane to move it around. It's kind of tricky putting the joints together. They've got to be vulcanized together, and Carlisle is reluctant to sell it to you. You pretty much have to get it through a bonded roofer, but it's mighty good stuff. It comes with a lot of goodies too, like ready-made inside and outside corners, pipe flanges and all kinds of fittings, so it's a very sophisticated system.

This is another variation on the earth-tech house down in Newbury, Mass., which incorporates a Lord and Burnham greenhouse that is 28' wide and 14' deep. It has a hot tub inside. In the winter time, we pump air out of the greenhouse, through a return air duct, into the hot air, down draft, hot air furnace and bypass the burner. The burner isn't turned on — the air is pumped in through a double floor, then back out into the greenhouse. Meanwhile, it charges the floor so we're taking that heat and essentially storing it in the double floor, the same kind of double floor I've got in my house. So, again, the tiles on this floor are warm in the winter time when the furnace is on, or, when we're pulling solar gain out of the greenhouse. This is, I think, pretty much what you would imagine. It gives you an idea of why insulating under the middle of the floor is not the first priority. It also brings up the idea that Tom Bly and others have worked on, of extending insulation along the top of the roof and, then, out over the backfill, so that any excess heat from the house is actually stored through the wall in the backfill. That wall is against even more moderate material.

The double floor was built by casting a slab on grade. In that slab were anticipated any grade beams that would be needed for the building later on. Essentially, we started with a smooth slab. On top of it we put down four-inch concrete blocks, 4" x 8" x 16", standing upright. They were put on 2' centres and alternated on rows, so that the first row would be a block, then a space, a block, a space; the second row would be a space, a block, a space, a block so that air could circulate. Then, on top of the blocks, we put down steel decking, just the regular corregated steel decking they use in high-rise buildings for pouring a slab. On that decking, we poured another 2 1/2" slab with six by six mesh in it, so that second slab is essentially only spanning two feet at the most and, if, in fact, you could pull the decking out, it's only there to form it. It's fast and quick and also allows you to snake wires, piping, or mechanicals in there.

One builder was in the wood business and was adament about having an all wood foundation — all treated lumber. We priced it out and compared the prices in Maine where concrete today is in the high 30's per yard. By the time you add the extra dimension you need for extra lateral loads 10 feet below ground, you are talking about 2 x 8's, 16 inches on centre and 3/4" plywood. And that blew wood right out of the water, as far as cost competitiveness was concerned, but you can certainly use it. I've never used treated wood but it would be interesting to try. Concrete blocks, that's another option.

You can get in big, big trouble with clay backfill. It won't work. The trouble with clay is water — if it's in that clay at all, you've got to have something to stop it. And, unless you put in an impervious gutter, which would be very difficult to do and very difficult to maintain.

Section G

ASSESSING CONSERVATION

20 Energy Auditing: Low Rise Buildings

Charles Wing:

Mr. Wing founded Cornerstones, the Wing School of Shelter Technology in 1976 and that company has become a leader in home energy audit techniques. Cornerstones was selected to run the pilot Residential Conservation Services program (CONN-SAVE) which is the first official RCS program in the United States and which audits about 100 Connecticut homes per week. Wing is also an author of articles and of four books on energy and lifestyle. Mr. Wing lives in Maine.

For those of you who are not familiar with the energy auditing that is going on in the U.S., I should probably tell you the scope of the effort. It's called the Residential Conservation Service, or RCS. It's part of the Energy Act of 1978 which is now being gutted by Reagan systematically.

The Residential Conservation Service was a mandate to the utilities — the large, regulated utilities. They offer a comprehensive home energy audit to their customers for no more than $15.

The type of audit that was specified by law is so comprehensive that, when offered in the private sector, it typically cost $150. You can see that probably the response to such an offering would be overwhelming, and it has been in many cases, where the utilities have promoted it in a positive way.

For instance, in Connecticut right now, they're doing 1,000 audits per week with a team of 120 auditors. And this program is going on in some 30 of the states so far. They estimate that there will be, within the year, between 10,000 and 20,000 home energy auditors as professionals.

Our organization, Cornerstones, got into home energy auditing because we found that at the time some of the utilities wanted to run pilot programs to find out exactly what they were going to get into, we in fact were one of two companies in the U.S. who in effect had a computerized energy audit. From that Connecticut pilot program to this day has been pretty heady and pretty desperate to the extent that I've been able to do nothing but work on energy auditing programs.

Energy audits have only really existed for about four years. That being the case, it has not yet been decided, or officially resolved, by any of the powers that be, exactly what an energy audit is. There is not yet a certification requirement for energy audits and auditors in the U.S. even though there are literally thousands of people running around doing them. I'm sure you're going to confront the same problem here in Canada.

Keep in mind that when I say "energy audit," there are variations on the theme and, in fact, the best energy audit may be two years down the road.

An energy audit consists of, number one, an inspection of the thermal envelope — that is, that surface that separates the conditioned or warmed living space from the outdoors. It includes all the surfaces — the windows, doors, basement floor, etc.

Number two, it includes an inspection, a quantification, a testing of the space heating and cooling system, whatever the nature of the heat source.

Number three, there is an inspection and quantification and somewhat limited testing of the domestic hot water supply system.

Number four, there's lighting and appliances; that is, utility usage. And there is a point which separates some audits from others — a renewable energy component.

The RCS law specified that there be two parts to the audit; that we talk about reducing energy use in the home by the first four points here mentioned, but that we also go beyond and talk about displacing conventional fuels with a renewable energy resource, such as solar and wind.

The approach taken by most companies is to roll these two audits into a single audit. In the U.S., we define three classes of audit.

A Class C is sort of the promotional-material, literature-only thing, which is not very prevalent, with very, very low cost and no quantification of cost and savings.

Class B is a do-it-yourself audit. This is very prevalent. In fact, it is very often offered in conjunction with the Class A, heavy-duty audit. Most of the motivation is that utilities would feel that if somebody does a Class B audit himself, then he will not go on and order a Class A audit, so it lightens the burden somewhat.

Anyway, many states are offering Class B audits where the homeowner fills out a form with elaborate instructions — sort of like an income tax form — sends the form in, and the computer analyses it and sends it back. The cost of that service is very, very low. And also the success of the program is very mixed. In Maine, of all the forms that go out fewer than 50 percent ever return because — as simple and as good a form as it is — most people simply cannot fill out the form.

Of the ones that are returned, less than 50 percent will run without blowing up the computer because obviously there is a very wrong answer on the form.

The RCS program involves Class A audits, that is, a trained auditor going into the home, interviewing the homeowner, taking the data, filling out a form, submitting it to the computer, and then explaining the results to the homeowner; very expensive service. Typical cost in the RCS program is $125 per audit. You could also figure it at roughly $30 per auditor per hour in the field in a large program.

Finally, there's the house doctor. That is where the auditor not only gives the homeowner the rundown on what he can do and how much it would save, but he actually goes and does those most simple things for the homeowner. It typically takes a day or more, and may involve two people. It's a very expensive service. It is not offered by any of the utilities, because it's not required.

It's becoming more and more recognized that the real purpose of an energy audit is to sell energy conservation. I think this is very important to grasp. If you remember nothing else of what I say, please remember that the purpose of an energy audit is to sell, and what we're selling is energy conservation.

There are various people interested in selling energy conservation. It may be the government which is concerned about the stability of the world, the dependance on foreign oil. It may be a utility who doesn't want to build any more power plants, or it may be a utility that wants people to switch fuels to their fuel, for instance. You can sell a lot of different things under the generic term energy audit or energy conservation. Or it may be a solar manufacturer — somebody selling woodstoves, an insulation contractor, an oil fuel dealer, anybody who has a vested interest in getting the homeowner to do something.

It's a remarkably effective tool, and like any sales tool or sales program, it involves at least four steps or it fails. The first thing, of course, is to get your feet in the door. I'm talking from the perspective of a salesman, which I guess is a little crass to government bureaucrats and idealists, but we really are talking about selling something, and so the first step is to get your feet in the door. This is a remarkably difficult thing to do.

There have been statistical studies done in the U.S. on what percentage of the people would take a free audit, a $5 audit, a $10 audit, a $100 audit, etc. This is part of the argument about what fee should be charged. It's amazingly difficult to get a homeowner to let you in the door. Fewer than .1 percent of the public would pay over $100 for an audit, even though the audit may pay back the cost in a period of three to four months.

Even at the $15 level, there are many states in the U.S. where fewer than 1 percent of the people accept that service and are willing to pay that price.

The next task is to establish your credibility, overcome the homeowners doubts about why you're there, and establish the fact that you do indeed know what you're talking about.

After you've got the homeowner's confidence, after you've broken through the barrier, the homeowner is desperately looking for someone to come and tell him what to do.

He's beseiged from all sides — in television, radio, newspapers, magazines — by messages from manufacturers that if you just buy this gizmo, you'll save 50 percent, or that gizmo . . . Pretty soon, he adds up in his own mind three or four gizmos and he comes to more than 100 percent and he says, "so much for that."

He's really looking for someone who's objective and knows what he's talking about to come in and say, "look, here are all the things you can do, here's what each one will cost, here's what each one will save, and this is the order in which you ought to do it." It's not too difficult to establish that credibility.

The third step is, after you've won over the homeowner, you then have to provide him with enough information on which he can make a decision. You have to give him the inputs in order to make a decision to go ahead and do something. You have to provide him with quantification, cost savings, paybacks, and the order in which to do it.

Also, you have to provide him with information on how to do it himself, using pictures or very simple instructions on how to insulate his water tank, or insulate the attic. In the cases where he can't do it himself, even lead him by the nose through how to deal with a contractor. Give him a sample contract form, give him a list of contractors who have agreed to do the work for the estimated cost, for instance, or who have guaranteed their work.

Finally, you have to wrap it up and you have to do whatever you can to make him do it instantly, because if he doesn't do it right away, he never will do it. A real salesman knows that you don't leave the home until you get the name on the bottom line, or close the deal. And, since you're selling energy conservation, that's what you have to do.

Now, as for data, how do you get it processed? There are a wide variety of options. We started out doing hand calculations. Hand calculations are probably not much worse than computer calculations, as far as accuracy goes, because, as they say in the computer business, garbage in, garbage out. But they are slow, and they're tiresome to the auditor and you'll find over a period of time that the auditors lose their enthusiasm.

Hand calculations are being used in several states in the U.S., the closest one being Vermont. Vermont is a very laid-back state, and the auditors enjoy going out and doing one audit per day with their little calculators.

The next step up is the programmable calculator. Very often aTI 59 or HP 41. A larger version, more sophisticated, programmable calculator, which verges on a microcomputer, enables the auditor to do the calculations very rapidly with a minimum of strain and boredom.

The programmable calculator is, however, very limited in terms of its memory. You cannot have data banks which speed the process. It really can only do the calculations for you.

Next step up is the remote terminal where you access a host computer by way of a terminal plugged into the telephone. The TI765 bubble-memory terminal which the auditor enters his data into, and the bubble-memory, a 20,000 byte memory, has an error trap program in it, and it sort of checks his data before it goes down the telephone line to Virginia or Washington or wherever the host computer is, and catches most of his errors.

Picture what would happen if you didn't have this. More than 50 percent of the time, when you're entering data, you make a mistake — either a keyboard slip-up, or you thought something was other than it was. The error trap program can be very sophisticated in cross-checking data entries to make sure that you didn't imply one thing here and then contradict it over there with a second piece of data.

If you were to access the host computer by dialing up, in our case, Virginia, at a very expensive rate per minute, and then the computer fed back that this piece of data is bad. So having a facility to do error trapping in the terminal is very valuable. And after the terminal says okay, the data looks good, then you dial up the number and zingo, in it goes, and it immediately comes back and prints out.

A very popular approach in the U.S., taken by Intercon or General Electric, is the voice link where you use a touch-tone dialer to enter the data, and the computer has a voice synthesizer which returns the data like an R2-D2 — you know, little robots.

The next option is batch processing. With batch processing, you can get very high speed line printers and the volume of output is no hindrance. And in our particular batch processed audit, the report which the homeowner receives is typically 70 to 80 pages, with say 30 to 40 pages of computer printout, very much like word processing, full of texts, paragraphs, etc., and then a 40-page, hard-printed booklet on how to do the work.

Finally, over the horizon, probably a year or so from now, there will be the micro-computer — The Apple 2-Plus, the TRS-80s — all of these micro-computers that are making such great inroads.

A micro-computer can probably do anything that the batch processing gigantic computer can do, and can do it in the home, and not require access by way of the phone, and can do it instantly, and can be a turnkey operation where once the auditor has possession of it, he's not linked to anyone. He's on his own.

We are in fact working on a stand-alone, Apple 2-Plus audit which is similar to our batch audits. In an urban area, you can use computerized scheduling — scheduling as much as a month ahead of time — and auditors can really zip around town. The average mileage per audit is about 10 miles in a city, and the auditor can crank out 15 to 20 audits per week. However, you have to pay auditors more to work in the city, so the cost per audit would probably be $120 to $140 per audit. This is total program cost. This is certainly not what the auditor himself gets.

You can also figure that at $30 to $35 U.S. per audit delivered, roughly. In a suburban area, the auditor is likely to put on between 10 and 20 miles per audit. His productivity will be up to three audits per day.

In northern Maine — and I imagine it is very typical of many parts of Canada — the mileage becomes very expensive. Even with the best scheduling, the typical mileage is 50 or more per audit. And it's the sheer time involved in getting from one place to another that limits the auditor to perhaps two audits per day.

However, the auditor living in a rural area by choice, gets paid less so, the cost per audit is not that different.

Who would make a good energy auditor? I like to watch what goes on in Canada because I think you're very smart in watching what goes on in the U.S. and avoiding most of our mistakes. What I'm trying to give you here is the benefit of our experiences — the benefit of our many mistakes.

One of the mistakes we've made is in hiring energy auditors, and the most recent experience we had was with a utility which wanted to use their in-house people who formally showed people how to bake cookies or answer the telephone, or whatever.

Their idea was they had many people aged 60 who really didn't have a very productive job in the utility and this was a real good thing for them to do for the five-year life of the RCS program, and it wouldn't cost them a great deal more money.

So, we trained 40 utility employees. We gave a mid-term exam in a two-week course and, at the end of the first week, 20 of the utility employees failed.

Utility employees, particularly the longer term ones, the people who've been involved in energy programs before, tend to think that the utility and only the utility knows all about energy. And they're very resistant to new ideas, and the energy audit is a new idea and the technology for computing energy loss in the home is relatively new, and so there's great resistance.

Retired people I would have thought "no" — the people cannot get into the attic nor are they interested in crawling through space under a house, but the retired people who have come out and wanted to do the job have turned out to be terrific. They have retired and found they didn't like retirement. In fact, they want to go out and do something that's good for the country and they're terrific. In the U.S., we have a program called CETA. I forget what the exact term means, but it means retraining the unemployed and sometimes unemployable, and they do not make good auditors. You find out why they are currently unemployed, because they make very poor employees, so I would stay away from that type of approach.

Young solar advocates are great. Remember, we're selling something. It's a sales tool. They firmly believe in this product. They think it's good for the homeowner, it's good for the country, it's good for nature, it's good for everything that everybody can conserve energy, and boy, do they go out and sell energy conservation, and they retain their enthusiasm, and they're young and energetic and idealistic.

A contractor, particularly in housing, is an ideal energy auditor in that he's already been energy auditing, in a sense. He's already been estimating dimensions, costs, etc., doing most of what an energy auditor is, in his business. And many of these people are unemployed at this point, and so if they're interested in being an energy auditor, they're generally very good, very quick.

One utility we have a contract with uses nothing but school teachers on the weekends and in the summer. School teachers are very good at communication, very good sales people, and they already have a salary, and they don't demand too much more money. Auditor training should not be taken lightly. Anybody requires a minimum of 60 to 80 hours of training. And even at the end of a two-week program, you do not have an energy auditor. You have a theoretical energy auditor.

You have a true energy auditor perhaps after a month in the field when he has seen that reality never conforms to theory, and he has encountered 90 percent of the strange things that go on in house. Therefore, he requires very close initial supervision — that awkward transition from theory to reality. Furthermore, you need a continuing feedback loop. You do not set loose upon the country side an energy auditor and assume that he will continue to operate in the same mode that you trained him to do.

The computer error trap is one check. The computer will not let him go too far astray because it's looking for reasonableness of numbers and for inconsistencies.

In our auditing systems, we also have incorporated what we call fuel agreement factors. Very often, the homeowner can give you the past year's fuel usage. That's the possible data; that's better than any theory if you can get it.

QUESTIONS & ANSWERS

QUESTION: How accurate do you feel you can be in measuring infiltration?

MR. WING: I feel statistically we're probably no better than plus or minus 50 percent. Of course, there's no way to tell. You can't really objectively check and see what you've got, even when you're testing with a blower, you're really blowing under certain conditions — temperature, wind — and then you're relying on theory to extrapolate those, so who knows?

QUESTION: That means the overall is about plus or minus 20 percent.

MR. WING: Yes. Let's put that into perspective, however. An error of 20 percent in the overall audit, that is, the overall energy consumption of the house, will affect pay back, or annual rate of return, by 20 percent. In no case will it make something worth doing not worth doing, or vice versa. And in very rare cases will it change the order of priority of something.

For instance, let's say that the perfection was that caulking and weatherstripping had a payback of .5 years. If we were wrong by 20 percent, then it would be .4 or .6 years — big deal. So an audit really is a very qualitative sales tool in just trying to get someone to do something.

QUESTION: What kind of experience are you finding with people keeping their own records before and after the audits are done?

MR. WING: It varies. In the case of the utilities, the utilities do that automatically, so we have very good data, and that is part of the RCS program — requiring that data be obtained for a year in advance and be kept for five years after the audit in anticipation of doing some studies.

In the case of oil audits, 50 percent of the people have elaborate records. The oil dealer has them, and the homeowner has them as well. We suggest that they get them. To me, there's a surprising number of people who do have elaborate records.

QUESTION: You said at one point that in fact it was the people who didn't need audits who asked for them. Are you doing anything to try to adjust this?

MR. WING: Our position is simply that of a software vendor and trainer of auditors. If you've been reading or listening to television on what's going on in the U.S., Reagan feels that private enterprise is the only way, and to hell with the poor people. But, on a more local level, there's a town in Rustic County, Maine, with a population of 2,000, which sent a person to become an auditor, and they are systematically auditing every house in town. That's the sort of thing that's reaching the poor people.

A private operator can't really afford to go out and do an audit which truly costs in the order of $100. He won't stay in business long doing that, so there has to be another mechanism.

The rich people in one sense don't need it because they've got the money to pay. On the other hand, they do have the larger houses with tremendous fuel bills.

We found in Connecticut, in the first year, the average-sized house we were auditing was 2,200 square feet. That's pretty big. We also surveyed the average income of the people ordering the audit. The average individual income was something like $28,000 two years ago, so you see who it is you're auditing. In fact, when designing the data input form, we allowed for up to 100,000 kilowatt hours per year electric usage. So far, we've had over 100 cases where people used more than that. We're almost into a commercial scale in some of these houses.

QUESTION: Regarding support services to back up audits, and the experience we've had with the installation program, there's been a lot of problems with quality control and that sort of thing. Has that been your experience in the U.S. as well?

MR. WING: When the federal government first came out with this RCS program, and the interest groups — such as the home heating oil vendors, insulation contractors, solar contractors, League of Women Voters — found out about the program, they all assumed that the utilities were up to no good. The poor utilities thought it was terribly unfair because they didn't want to do it anyway. They were being told to do it.

We expected a great deal of problems, so we took a positive approach. We said, "Come let us reason together," as our past president Lyndon Johnson used to say, and let's sit down with the utilities over here and the oil dealers over there, and let's talk about what we're really doing, and how it might be in both parties' interest.

Immediately, within a couple of meetings, the whole atmosphere changed. The oil dealers' attitude went from feeling very threatened to seeing it as a positive thing.

Now the fuel oil dealers are voluntarily going out and doing the testing and complying wonderfully. The same thing happened to the solar industry.

21 Energy Auditing: High Rise Buildings

Bob Tamblyn:

President of Engineering Interface Ltd., a firm of energy management consultants, Mr. Tamblyn is a former chairman of the National Research Centre's Energy Measures Committee and is a consulting editor of Canadian Consulting Engineer Magazine. He works in Toronto.

I am going to try and give you a national overview of how energy is being used, and how 30 of it is being used in buildings.

When we talk about energy, we use the term 'quad'. A quad is a lot of energy, as you know and we use 30 of our national quads in buildings. We waste quite a bit of it.

You may not know this, but we have 13 million square feet of buildings in Canada, with an unbelievable portion — 8 million — in residential use. That's about 400 square feet per person. All the other buildings put together are only 250 square feet per person, and so naturally, you would expect the energy to be a little high on the building side.

We have close to 3 million residential units in Ontario, and most of them are single family units. But the largest number of buildings are the multiples — small multiple row-housing.

When a building has 20 residential units, it may qualify for some special attention, in terms of energy conservation. Smaller buildings will probably have to be done on some sort of prototype basis, and the people who own the buildings will have to follow through on their own.

The auditing of buildings is usually approached by having specialists arrive, crawl through, walk through or run through, (depending on the time available) and making detailed observations. In a large complex, such as a major high-rise (residential), this may involve some weeks of effort, cataloguing detail, and trying to organize and arrange findings into understandable reports. Subsequently, there may be need for some system simulation and, a report outlining the findings and the possibilities for conserving energy. This has been the popular form of audit, and one used throughout North America. In the States, auditors are being trained to do this.

There is another possibility: the idea of looking back at our energy record to see what was actually going on, in the hope that, by analyzing the way energy was used, we might discover which buildings use the most energy. This seems to be a good step.

First of all, it quantifies the amount of energy being used and also lends itself to a certain amount of breakdown. For example, if you were to plot the use of energy in a given month and draw a line through the dots, you might be surprised to find out that certain buildings, still use a fair amount of fuel in the summer months. You would then conclude that certain kinds of fuel which are not sensitive to weather, whereas some are. It's quite a surprise to find that in downtown Toronto, some of the office buildings use a good deal more non-weather-sensitive fuel than weather-sensitive fuel.

A plot of the use of electricity consumption is instructive as well, because it may show the amount of energy used for summer air-conditioning.

In looking at 43 community colleges buildings here in Ontario, it was interesting to find out that they had saved $2 million worth of fuel — from $9 million down to $7 million today.

Most of the savings came from shutting off the fans at night. The second biggest saving came from de-lamping.

The popular concept for action (and the one practised by most governments at the present time) is to have a specialist draw up some plans and specifications, tender these out to contractors, take the best tender and start work on the building. After the work is finished, the operator is instructed in the use of the new, modified systems.

Another way to save money is, to bring the operators together in a workshop and to lead them in a discussion of what they can do to reduce energy consumption in their buildings. This has the advantage that the operators learn something while they are there, and they tend to be very proud of their achievements. Systems can work well if the operator is involved from the beginning and can help in some of the choices that are made. It's a good idea to remember that he, as the boss, has to be happy.

One factor on the workshop routine is that the engineer, acting as a facilitator, can work on three or four hundred buildings a year, whereas he may work on only three or four if he is out in the field directing the work.

I think the concept of an audit, then the action and finally, the monitor is essential. I think that at the present time, we are concentrating our efforts on audits. The monitor has received little attention and it's not considered or really involved in our energy conservation literature up to this point.

Several years down the road, however, when you've forgotten all about the original audit, you'll be very much involved with the monitor — and gauging the progress of the work you are doing. So the bottom line is: the monitor's important.

There are three popular ways to monitor. The one being used most is where they gather the bills together for a year and compare them with last year's — pat themselves on the back for a 9 or 10 saving. But they still don't know what energy-saving measures were productive and which ones were counter-productive; or how much each one was worth. But they do know that there was an overall savings. With monthly monitoring, it may take three or four months before you can really see a trend. Obviously, an accurate month-by-month monitor is best, but this requires a fair amount of normalization, but you'd see that, somewhere down the line, you did something that was productive or counter-productive. The difficulties with month-by-month monitoring are that you must regularize the metering interval. (The meter-reader doesn't necessarily arrive on the same day.) We do have major changes in some of the warmer months, and it's essential to have normalization to know that you really are on the right track. One of the most difficult parts of weather normalization is the fact that each building has a different balance-temperature, and the number of degree-days you'd use for the normalizing function, changes accordingly. A building may be trying to lose heat all the time, and it doesn't need heat for weather — it's problem is, to lose internally generated heat. Department Stores, for example, are not very weather-sensitive and can coast for weeks without much heat input. They decline in temperature around the outside, but not towards the middle. Any anomaly on a month-by-month monitor is worth reviewing, if you are serious about a long-term energy program. And, we must be serious because, where energy is concerned, if you don't learn to balance the budget, we must learn to budget the balance.

Bruce Robertson:

Managing Director of Petrosave Inc., Toronto, Mr. Robertson has been involved in the sales and installations of energy management systems in some of Canada's largest commercial and institutional complexes. He has a degree in electronics engineering.

It goes without saying that you have to know your own building. And if there's one problem and it seems to be industry-wide, it's that people really don't know what they own.

We are primarily a controls-oriented group so that many of the problems that we encounter, other than changing mechanical systems, can be overcome by control solutions. Control solutions can be as simple as locked thermostats (so people can't get at them), to a very sophisticated computer-control system in a high-rise building to control heating. Most of the technical problems have been overcome — it's people we have the problems with.

If you have a building, be it large or small, I'm sure you've run into some of these problems. I'm just going to list some of the areas, so you will become familiar with what I am going to talk about, such as corridor ventilation.

There's always what we call a 'stack effect' in a high-rise building: it's always hotter at the top than at the bottom. It's a lack of control, and it's inefficient. Most of them are gas-fired, at least in the Toronto area, and some are electric.

Their control of the hot-water temperatures is somewhat dubious. There's always the problem of over-heating in the building and to the tenant. Domestic hot water, be it large or small, either gas-fired or oil-fired represents a very high electrical load in a building, especially if it's tenant-controlled. Tenants aren't too pleased if you tamper with it or reduce demand. Temperature ranges, we found, have been in the 75 to 85 range, day and night, in most buildings. Tenants get extremely upset when we reduce it to from 70 to 72. The legal limit in Ontario is either 68 or 72. Because the building characteristics of every high-rise are different, controlling and understanding them is interesting but, difficult.

Most of the buildings that we see don't have central air-conditioning, so most of my comments will apply to heating.

Ramp-heating is an interesting example. An experiment was done with Ontario Housing Corporation and, in one year, the system ran 7,000 hours. Last year, we metered it at 30 and that's over an entire heating-session, with some very basic control-systems.

If you have investment property, government rent-control has a major impact on your profitability. In fact, you are deficit-financing most of the time. And most important of all, the building has a lack of control: lack of control from both a technology standpoint and a management standpoint. If you don't know where you are, how do you know where you are going, and how do you hope to get there? That's really probably the biggest message I want to get across. If you don't know where you are, in terms of your building operation, you really don't know how you are going to get there, when you arrive there, or that you have, in fact, arrived. Monitoring and auditing are both very important, but it's financial control we are really talking about. It is really important for the building owner to understand how and why his building operates, and what's feasible and practical, in terms of energy-management — and cutting costs. We've seen as much as $700 a suite (for total energy usage) in a building. But that's extremely high — I own a detached home in Mississauga and my energy bill for one year is only $600, including both hydro and gas.

I would like to offer some basic solutions. For people who have smaller buildings, some can be equally applied. The main point I would like to make is, that, most people don't realize that the main element in a control-system is space temperature. We proved this by designing a system (for an owner) that used space temperature as the criteria for control in the building. When the heating was turned on, the boilers came on exactly two days in three months. The building is so warm from people load, electric load and solar effect, that temperature range in the building, at night, is around the 70 to 72 degree mark. During the day, it's about 80 degrees in some parts of the building. In the sister building next door (and these are 300-suite apartment buildings), the boilers have been going full tilt since early fall. So, you have two different buildings: one having suite-temperature feedback or the ability to sense temperature in the building; and the other, a traditional one, heating fresh air. It was only a $6,000 job, and we know the system has paid for itself already.

There are many solutions on the market, but always keep in mind (whether you have a small building or you have a large one), it is important to get your space-temperature back to the control system. There are no magic solutions, but we've found, both from the commercial and residential side, if you could somehow model an apartment building like a house-thermostat and control that building like a house, you've got a control system that: (a) would work (b) would save you an awful lot of money. And these are two things we are being asked to do now.

Once you do your audit and once you establish where you are, the next step is, how do I get there? Of course, the third step is monitoring.

And now, I'm going to illustrate some samples of the kind of technology that is, or will be, available. There's a micro-processor that uses the alternating current lines in a house as a signal carrier. It plugs into a conventional outlet. Every device in your home would have a transmitter that would receive signals from it and would be turned on or off, depending on time of day and frequency of use. It's only $1,500.00, so the average home owner, small apartment-building owner could use this system to control appliances like washers and dryers, electric heaters and even boilers. The technology for this system is being expanded to other applications in industry and in commercial buildings, and the costs are dropping dramatically.

Also, Bell network companies are now selling a PABX (private automatic branch exchange) system which has energy management capabilities. All it takes, is an average telephone — inside is a micro-processor that can switch circuits on and off and regulate energy. If you want to change the program, you will use your telephone handset as a keyboard, high-technology stuff, but companies are considering it for the average home owner. It's already in use for commercial building owners.

There's another system that might be of interest to small apartment-building owners. It's a micro-processor that sits on a boiler and it has three sensors: outside air, space-temperature and hot-water supply temperature, all for about $800.00 (the U.S. price). This machine can control a hydraulic system, and would work well for a walk-up unit, as long as it has one or two boilers. And for only $800.00, they claim that it will save 35. Using a relationship between space-temperature, outside air and supply-water temperature, this is entirely possible: the micro then starts making decisions based on time, temperature and space-conditions, and when you start introducing space-temperature into it, you begin to realize that the control system is saying, 'what's going on in the house? I don't care what's going on outside — it's cold, we all know that — but what's really going on inside the house?'

This is one of a number of things that have hit the market. It's a computerized home thermostat which has all sorts of features. It's basically the same, except for a gas-fired or an oil-fired furnace.

This is an actual system that is installed in the Ontario Housing Corporation. It's a fully-blown computer (control) system that controls ten boilers in a residential high-rise. It has a resistence temperature-sensor — eight suites have these temperature-sensors in them. There are sensors in the water-temperatures (east and west). There's also an outdoor air-sensor and a 32K processor that costs $2,000 and controls the entire apartment building heating-system. The system was installed for around $12,000. It's a fairly big system and it paid for itself.

The tenants are used to 80 weather. When the temperature in the building is 75 — they keep the windows open — they walk in, put their hands on the coils and complain that there's no heat in the building. In fact, if they closed the windows it would be about 75.

We can no longer exist heating a building at 85, and with the cost of gas and hydro-electrical energy, we really have to get serious.

We are going to have one co-axial cable, of just one-half inch, controlling all of the communication requirements in a building, from television, security building automation and fire, management information systems, process control, patient care and all connected to a computer. We see tremendous implications for property managers, because in future, you are going to be asked to consider such things as Teledon, or video-shopping, visu-phones, Infomart, Infotext — all of these high technology implications on video.

The little co-axial cable has everything hooked up to it, and the secret behind it is software and micro-computers. I'm convinced, in my own mind, that micro-processor technology is here and it's going to be used in this fashion.

The computer will calculate also the theoretical fuel usage based on the building's dimensions, thermal resistance factors, etc., then it will compare the two and give us a ratio which is what we call the agreement factor. If the agreement factor is too far off, we give the auditor a warning — is it your fault, or ours, or whatever? But that keeps the auditor within certain bounds, and also by doing a statistical analysis of his error-trap errors and his fuel agreement factors, we can detect the idiosyncrasies of an auditor.

For instance, if you ask the computer how many times is Auditor 123 recommending cellulose insulation in the walls, and how many times does Auditor 124 order up that particular thing, and you find that Auditor 123 specifies that 50 percent of the time, or 90 percent of the time, and other auditors are specifying something else 90 percent of the time, clearly these auditors have biases, not to say who is right.

But you can pick up these patterns, these idiosyncrasies of an auditor, and come back and close the loop with them.

The RCS program has been in operation in many states in the U.S. for over one year, and we're beginning to see auditor burnout. Auditing is very intensive — physically and emotionally, and if you drive the auditor too hard and you're trying to get the cost per audit down, you'll find very soon that the auditor feels used.

The energy auditor generally feels that he is an energy professional, an energy expert, and he's in there not only to make a living, but to improve himself. He truly regards himself as a professional and, like any professional, he wants continuing education.

The successful auditing programs are beginning to give him that in the way of weekend workshops, evening lectures, bringing experts in to talk about passive solar, wind systems, so that the auditor is not only continuing to be more of an energy expert, but feels that he is doing so, and it's worth it to stay in the program.

Ideally, everyone should get a house doctor audit. On the other hand, nobody's quite willing to sponsor that $400 or $500 audit. We can never lose sight of the fact that the audit is a sales tool, and salesmen know that you can overkill. If you give the customer too much information at too sophisticated a level, you may in fact kill the sale. So there is the trade-off of exactly when are we giving him the optimum amount of information to spur the action.

We have three different auditing systems going on right now. The first is in conjunction with Victa Business Machines, and we've come out with a series of mini-audits, or component audits, which we call the Victa Energy Experts. So far there are two. There's an oil system audit, there's a weatherization audit for insulation contractors, and we're coming out with a solar audit which will do active solar, passive solar, etc.

We also have the Texas Instruments Remote Terminal, and Boeing Computer Services' Time-sharing Network Remote Terminal System, which is being used in New Hampshire. That is a very sophisticated Class A audit, but with a very limited output. Probably a three or four page terminal output, typically.

The one that's being mostly used, of our products, is the batch system, a typical 30- to 40-page computer printout in conjunction with a 40-page book, so the homeowner actually gets a personalized book about his house.

It's interesting to note that the cost to a fuel oil dealer, say, for providing this very, very limited audit, concentrating on one aspect of the house, is between $80 and $100. The batch system is about $125 — total program cost. Even though one has a three- to four-page output, the other has a 30- to 40-page output, the cost of the batch system is no more than the home remote terminal system.

Next are the savings options. What can you do to improve this heating system? You have one or more of up to five different options: a setback thermostat, retention of the burner, a new system, a variable electrostat, etc.

The salesman would sit down with the homeowner and say, "Now let's see what would happen if we did this item and that item and that item — let's put them together and see what would happen." The computer has the algorithm to take care of the interactiveness of the options and it comes out with the recommended firing rate of the system, the new annual efficiency — therefore the fuel reduction — in this case, 34 percent fuel reduction. Then it asks for financial information because, remember, this person's selling something.

A fuel oil dealer is selling a package, so he says, "I would do this package for you for $470." Look at what the tax credit is; the machine will automatically calculate the tax credit. And then they figure out how many years the loan will be, and how many years of cash flow they want to project, and then — here comes the real sales tool — the cash flow projet typically 10 years.

Fuel prices and the homeowner's eyes get bigger and bigger as the machine churns out this projection and, after ten years, the homeowner would end up with $18,482 more in his pocket.

The clincher is the monthly payment and the monthly saving, and invariably the monthly saving is greater than the monthly payment, the idea that from the first month, you are going to be saving money because you're going to be paying us less than we're going to be paying you.

Finally, the annual return on investment, which the salesman uses very effectively by comparing to interest on a bank account, was 270 percent.

Now, on to a slightly different subject. How well have energy audits been received, do the homeowners really believe in them?

We did a pilot program in 1978 in Connecticut to get our feet wet and find out what was in store when we had to do 50,000 per year and, at the conclusion of the pilot, we surveyed the 800 customers who had received an audit with a questionnaire.

I think that if you are in sales, in marketing, you would be astounded at the favourable response to this sort of audit. This audit was the very detailed batch process audit, and 98 percent of the people found the auditor helpful. Was the audit as thorough as they expected? — 94 percent. Did they spend as much time in your home as you thought? — 97 percent. Did they think the auditor was reliable and objective? — 99 percent of 800 homeowners thought he was reliable and objective. That's amazing.

Of course, he wasn't trying to sell oil heating systems or solar collectors. He was trying to sell information. On the whole, did they feel the audit provided you with the information you need to make the decision about energy conservation? Yes, 97 percent felt they received enough information to make the decision. In details, did they read the specific recommendations? — 98 percent. Were the estimates of cost savings accurate and believable? — 90 percent.

This gives us some problem, because people simply cannot believe the magnitude of savings. When you tell them they're going to save 300 percent annual return on their investment, they simply can't believe it.

Of course the bottom line is what we're trying to sell here is energy conservation; we're trying to get them to actually do something.

At the end of the pilot program, we took the measures which were recommended most often and asked the people if they had already done it or did they plan to do so within the year. Only 70 percent to 80 percent said yes. Now that, to me, is disappointing. Even though they believed the audit was objective, they understood it, still we didn't really sell any more than perhaps 70 percent.

Maybe we only sold 30 percent of the people and actually got them to do something.

I can show you a couple of auditing tricks that we've picked up. This is about the sixth generation of audits, and we're constantly doing the trade-off of speed vs. accuracy. There are many audit systems out there — there are probably a dozen being used in the U.S. — and every audit is slightly different.

Ian Jarvis:

An engineer educated in England, Mr. Jarvis is now directly responsible for engineering, computer systems development and operation, energy management reports and training workshops and for research in the Operations Division of Engineering Interface of Toronto. This is a division formed to concentrate on energy management in existing buildings. In the past five years, it has been involved in more than 1,000 buildings of various types in Canada and the U.S.

There are three basic stages to energy management programs. And if a program fails, it's because one of the stages has been inadequate.

Let's run through the Sumac approach to putting these three elements together: Sumac stands for 'System for Utility Monitoring Analysis and Control', and what it does is two things — it fills the monitoring function and fills the auditing function. It does so simply by looking back at the energy record. It can give you a very substantial information base on any one building regarding energy use.

The first function is energy use breakdowns. Sumac generates eight components of energy use — eight individual components. On the gas-front or the oil-front, mentioned already, we can take out non-weather-sensitive fuel comsumption, and separate from weather-sensitive fuel consumption. The more information you have, the more judgements you can make about what's going on. On the electrical front, it separates what we call the base component, which is electricity use that continues throughout the year. For an apartment building, that means elevators, lighting and appliances.

We have all kinds of snow melting systems. Most buildings have them attached to them and the extra winter component is frequently a reflection of how well that snow melting system is managed. The summer extra component gets into the area of air-conditioning. We then make the same separation on building demand, on electrical demand and how many kilowatts you use at different times of the year. If you don't have much demand, but lots of consumption, it means that whatever you've got, you run for a long time. And if you have lots of demand, and just about normal consumption, it means that you've got a large load but it's well regulated. So the energy audit (the breakdown part of the Sumac energy audit) that's to generate these eight components that we can use to understand energy, is being used in buildings to give us a good feeling for where the problems are, and what things should be done to resolve them.

The Sumac information base is already well in excess of 1,000 buildings. The first one that we looked at was mildly interesting; the second one told us a little bit more; the first ten had a degree of fascination but by the time we had 20, we had some averages that were very useful. By the time you get up to 100 apartment buildings, you can pretty well scan through the list and always find one that is similar to somebody else's. Once you find that one, or two, or three, you can start making some fairly positive deductions about where this brand new, 14-storey, single-glazed, centrally-ventilated apartment should be. We know how much energy it's using now, but what can we compare it with. Well, pretty soon, you develop yardsticks that tell you. If we find that summer electricity use (which you remember is for air-conditioning) is high, we are concerned about the air-conditioning in the building — it's obviously a condominium and the base electricity use which is the catch-all for lights, fans, appliances, elevators and everything else, is quite average. In this building, the thing we need to address first, is the air-conditioning system. Maybe it has a force-loading system, maybe it runs all night when it should be cycling on and off. When we look at the electrical demand breakdown, we get more information. Look at the winter extra demand, it's very high. If you remember the extra winter consumption, the consumption was very low and the demand was very high. Now, what does that mean? It means that we have a large extra load that operates during the winter, but it doesn't run for very long. It doesn't use very many kilowatt-hours but it does comprise a lot of kilowatts. When we looked at the summer extra, we found that the consumption was high. Now we also find that the demand is high. So we are looking at a problem that's within the chiller — the air-conditioning machine simply has too high a load. It's not running for too long — it's running too hard.

Finally, the base electrical demand is normal in the same way as the base electrical consumption was normal, so we have normal systems running for normal times.

We've got eight components in every single building on file that we can look at; and based on those components, we can make judgements on where the problems are and which systems we should look at first. By taking what we like to refer to as an intelligent energy audit (one that doesn't just add up the kilowatt hours and the cubic feet of gas and the gallons of oil and divide by the square footage, but rather adjusts them to standard weather bases and breaks them up into pieces), we can get a very good feeling about where we should be looking in any one building, what kinds of things can be done, and how much can you expect to save.

So, from the breakdowns, what we remember previously, the graphics and the weather normalization, we've got pictures, numbers and weather normalization that allows us to compare everything directly. We can look at a building and say the weather-sensitive fuel consumption is too high, and from all this information we have in front of us, the probability is, it's ventilation. We know it's a single-glazed building, we understand the quality of the building envelope, and the only thing that could be causing the amount of excessive fuel consumption we see in winter time is, over-high ventilation loads.

If we see that that excessive use in the winter occurs during the very coldest months, it becomes attached to infiltration. The stack-effect in a building has been mentioned already. When it's very cold outside, you get the double effect. You get a higher rate of air movement through the building and you have to heat it further, because it's colder. So, when fuel consumption rises more during the very cold weather and returns to a fairly normal pattern during the mild weather, the probability is infiltration. When we see the converse — a very erratic response of fuel consumption to outdoor temperature to cold weather or October and April having very similar weather conditions but very different fuel consumptions, then the finger is almost invariably pointed at boilers. Erratic fuel consumption or excessive fuel consumption in the spring and in fall is usually attached to a faulty boiler operation.

Heating control is always the one that receives the greatest interest from apartment-owners. The problem can be very clearly seen. If you have the windows open, in the mild weather but have to shut them in the cold weather, we see a ramp. As the weather becomes milder outside, the fuel consumption simply doesn't drop as fast as it should.

Again, the Sumac graphics, the Sumac weather normalization and the Sumac breakdowns can show us fairly clearly that it is a heating control problem in this building. It's not a boiler-control problem, it's not a ventilation problem, it's a heating-control problem. Once again, the energy bills are telling us where to look. And on the air-conditioning front, which we talked about previously, we are looking at electricity consumption being too high.

We therefore start the kind of programs we've been running with some private groups and the Ministry of Housing. We start with a review of the energy record through a computer program that can tell us, in fairly clear terms, where the problem in each building is, how much is likely to be saved and what each person is supposed to be looking for. We've now got through the audit stage, now we get to the action stage. Now we know what to do. We know how much can be saved and somebody's going to have to do it. We get a fairly good mixture of superintendents and building managers. We mention a few things that we think they should be doing, and then we get resistance or comment. Once you've served as a catalyst, the workshop process becomes one of inter-action between people in different buildings and in different circumstances, who collectively have all the experience needed to make the thing work. The primary communication in any workshop is between the participants, who invariably have got exactly the same work environment and the work experience. They are all managing apartment buildings, so they all know the problems and they will believe each other far more easily than they will believe us, so the workshop works well.

At this point, we've had something like 50 property managers, and most made very worthwhile contributions.

This is intended to be a continuous process where we work directly with the people involved and, at the end of that eight month period, they understand what is going on within their buildings, and that they can continue the process with the superintendent. Once people get caught up in this thing, you will find that, year after year, you continue with it.

22 Municipal Experiences In Energy Conservation

Doug Raven:

Administrative Officer for the City of Burlington and Co-ordinator for the city's energy conservation program. Mr. Raven has studied opportunities for and barriers to energy conservation through planning.

I'm going to be talking to you about the City of Burlington's Community Outreach Program for Energy Conservation. Burlington began its energy conservation related activities two and a half years ago. We had an energy audit done then of most of our municipal buildings by a consultant. Following up on that, we formed an energy conservation committee for the city. It was an in-the-staff committee, composed of members from all the city departments, and that committee proceeded to act upon the recommendations of the consultant reporting the energy audit.

We started working on city buildings, doing minor things — putting in ceiling fans, insulated doors, turning thermostats down, turning water heater temperatures down, trying to get people in the city to think about energy conservation.

We then moved on to vehicles — switching to propane, down-sizing our vehicles, emphasizing energy conservation in the driving of the vehicles. We then moved on to planning — trying to look at our zoning bylaws and our official plan to see what we could do for energy conservation in those areas, and finally we've just begun to put together a program — a Community Outreach Program for energy conservation.

It's that program that I'd like to talk about. Because the problem of mounting an energy conservation program in the community is usually complicated by the fact that municipalities don't have much money — they may not have any money to work with when they're trying to set up this type of program — this presentation is going to be entitled "Community Outreach of Five Dollars a Day".

What I'd like to do today is to pass along 10 tips for a community outreach program which we've found to be invaluable in mounting our program, and they may hopefully be of some help to you.

The first tip is: make sure you know what you're doing before you start. This may seem fairly obvious, but it is very important. The temptation with something like the Community Outreach Program for Energy Conservation is it sounds like such a good idea that you want to run out into the community and get the ball rolling right away. This can often be one of the worst things to do, especially if you only have limited time and money.

It's much better to resist the temptation. Take some time to talk among staff, talk about energy issues, talk about the ways you might best put your resources to work, and then go out and set about a program.

In our case, we had an energy conservation committee working for two and a half years before we set out into the community. Through our experiences, we acquired a good knowledge of energy conservation issues and ways to promote energy conservation, and we've felt that there's no substitute for experience when you go to mount a program in the community.

The second tip is to cultivate your municipal council. Many councils are not in favour of community outreach programs because they can't see any tangible returns for money and staff time spent on that type of program. They're not directly cutting down the cost to the taxpayers that they can see reflected in the city's own taxes so they may be reluctant to support your efforts.

If the councils starts to drag its heels on you, you're not going to get anything done in the community because there's always going to be this roadblock between yourselves and the community.

In Burlington's case, that same two years when we were learning about energy conservation in our inter-city operations helped us to convince council that we could do something worthwhile.

We managed to greatly reduce costs in the city, and when we went to them with our proposal for community oriented activities, they were fairly receptive because they had seen that we could do some good for the city — a good public relations tool, and we could do it on fairly limited resources.

If you can't cultivate your municipal council, as a last resort you can always try and throw a little fertilizer on them, and they may just throw it back, but that's fairly common.

The third tip is to identify specific problem areas that you plan to tackle, and then focus your activities on those areas. Again, the best way to make use of limited resourses is to find the areas where you think you can have the greatest impact.

Ideally, you'd like to survey people in the community, find out what their present energy habits are, find out what their attitudes toward energy are, and then go about attacking those behaviours and those attitudes.

But few municipalities possess the resources to carry out this kind of survey, and so a good proxy is often to contact different groups and organizations in the community, find out what their concerns are. This way you get a good idea of the community's concerns about energy, and the kinds of things you might be able to do.

In Burlington, we found that one of the major problems was that many people were really confused about what energy facts were. They had volumes of information coming at them from the provincial government, the federal government, a lot of private oil firms, and other companies.

In fact, most of the information anyone would ever want to know about energy has been put into a pamphlet somewhere by somebody. The only problem is getting the right pamphlet to the right people, and making sure that they implement those ideas.

So, in Burlington, we've set getting this information to the right people, and acting as a co-ordinator for information in the community as our main task. We're going to try to redirect the information from various levels of government and from other organizations to the right people in industry, commerce, and the residential sector.

Then we're going to try to encourage them to put these ideas into use.

Tip number four is to involve as many community groups and organizations as possible. It serves to increase interest in your activities because you make other groups responsible for their success, and once you become responsible for someone's success, you're much more likely to put a lot of energy and time into it.

It also enables you to mount a program on a scale which wouldn't be possible with just your own limited personnel and time resources. You get some other organizations to shell out some money, let them use their people, and that takes away a lot of the burden on your own municipal resources.

As well, you'll find when you contact these groups that many of them have a great deal to offer in terms of expertise in and knowledge of the energy field. They'll be able to teach the municipality quite a few things about energy conservation in the municipality.

Tip number five is that once you've contacted these groups, plan specific programs around which these groups can organize their own activities. If you just give them the idea they should get involved in energy, they may think it's a good idea and this idea may never get put into action, but if you give them some activities to focus on, you're much more likely to get some kind of response.

In Burlington, we're planning an energy conservation week to provide the focus for people's activities. So far, we've got the Burlington mall and a local service club to plan displays of energy conserving products and other energy ideas. We've got the school boards to develop hands-on activities for that week for their students, and we also hope to involve libraries, professional groups, and the local news media in helping to promote the concept of energy conservation in the community.

One word of caution: if you're planning a specific activity like an energy week, plan it well in advance. We've planned ours about six months in advance, and that was just enough time for a lot of groups to get their acts together. It takes a lot of time for the wheels to start turning, and for them to get something on the ground, so make sure you give yourself a lot of lead time.

If you start sending out form letters and just any other letters to people saying "we'd like your involvement," chances are you're not going to get a great response. It's been our finding that if you call people up, show up at their doorstep, say "I want to talk to you, I've got some ideas, will you listen?"

Chances are they will listen and you can get some kind of commitment from them to do something about energy. If you make sure they get back to you, you demand an immediate response, they're much more likely to get back to you than if you just file off a letter.

If you show that you have enthusiasm to go out into the public and make the contacts, they're much more likely to show enthusiasm in return.

The seventh tip is that when you're going to publicize your activities, don't just look to the newspapers and radio and television stations. Also look to less conventional news media to try to get your message across. A couple of years ago, the town of Vernon, B.C., carried out a very successful advertising campaign through the local newspapers and televison media, but they were a fairly isolated community, and that was great for them in a city like Burlington, however, we suffer from the same problem as many other municipalities close to a large centre. We've got Hamilton on one side, Toronto on the other side, and many other municipalities around us and it's very difficult to find a local focus for that kind of news media.

We get Toronto newspapers, Hamilton newspapers, televison and radio stations from all over —half of Ontario and New York State —and we really can't tell people about our programs through those media.

So we've come up with a number of other alternatives to that which we are going to use. One is through local reviews and newsletters, such as the Chamber of Commerce Review, or newsletters of community groups.

Our recreation department sends out pamphlets on their activities. We're distributing information on our programs through those pamphlets. We're also planning to send out information on our activities with our tax bills. Although we understand that those may not be as well received as some other kinds of media, they should be effective in at least getting the message out to everyone in the city. These methods are fairly inexpensive, that's one of the other benefits of them.

We're also planning to hand out material to people applying for building permits. If someone comes to you for a building permit, you tell them what they can do to conserve energy when they go about that activity.

Tip number eight is: make sure that whatever you're promoting in the community is not in conflict with either city by laws or local utility capabilities. There's no sense in promoting greenhouses or solar collectors if you have a zoning bylaw that says you can't build greenhouses or solar collectors in a lot of area.

In Burlington, we're examining our zoning to make sure this kind of thing isn't going to happen. Similarly, there's no sense in promoting the switch from oil to electric heating, and really pushing that if your local hydro utility is already at capacity and couldn't supply these extra people without pushing their rates 'way up.

Conversely, if your local utility has a lot of excess capacity, there's no sense in telling everyone to conserve their electricity, because they'll be 'way under capacity and the rates will have to go up as well. So make sure you consult your local utilities before you make that kind of decision of what kinds of energies you're going to promote.

Tip nine is to try to look beyond conventional energy conservation activities. Too often energy conservation is just thought of as using less energy: not driving a car as far, turning off lights, insulating your house.

Energy conservation can also mean converting to renewable energy resources or recycling the used materials. For instance, producing paper from recycled materials is much more energy efficient than producing it from trees out of the forest.

In Burlington, we're about to start a city-wide paper recycling program. We started with a small area in the city two years ago and, in one year, a variety of groups had collected 200 tons of newspapers at no cost to the city. We saved over $1,300 in land-fill charges, as well as 565 cubic yards of land-fill space, and with garbage becoming the important issue it is in so many communities today, this could be very important for municipalities in the future.

We now contract out paper recycling for all parts of the city, with other materials to be recycled later, and we found that this type of activity is especially beneficial in Burlington. Most of the collection is done by local groups, including Scout groups, church groups and school groups which are trying to raise money for various activities.

Some of the sorting of the newsprint is being done by handicapped workers from Ark Industries in Burlington, so again, it's a very worthwhile activity.

We've also started to recycle fine papers in City Hall, and we're using the revenue generated by this recycling to support our energy-conservation program.

The last tip I'd like to give you is that, today, energy is a relatively popular issue. In a couple of years, it may not be. Other issues may come to be more important.

When you're trying to work out a program for the community, try to establish a framework that will result in your activities being carried out in the future.

Glen Wood:
Conservation Co-ordinator for Brampton Hydro in Brampton, Ontario, Mr. Woods work has focused on developing a home energy audit program.

Brampton Hydro has been active in conservation for some time. We've done a number of things that other hydro commissions across Ontario have done, such as sending out regular mailings to our residential customers, holding industrial seminars, doing commercial and industrial walkthroughs.

But the focus of our activities has changed rather dramatically in the last year to look more at the residential sector and to offer a more specific service to our residential customers. The home energy audits that I'm referring to are offered free of charge to all Brampton Hydro customers. They consist of a visit to the homeowner's home or renter's home by a trained energy advisor — that usually me.

The advisor goes to the house and looks at insulation levels, caulking and weatherstripping, storm windows — the normal sorts of things that get examined — as well as the heating system and the domestic hot water system.

While in the house, the advisor offers suggestions on low-cost and no-cost energy saving practices that the homeowner can adopt such as doing cold-water wash, or turning down the temperature on the water heater.

He also calculates the annual costs, or the annual energy savings, from a number of conservation measures which require some investment and gives the homeowner some estimate of what that investment will be for such things as storm windows, adding insulation, and more costly measures.

The homeowner is then left with a written report detailing where he can save energy, how much it's going to cost him, how much he can expect to save on each measure, and what the payback is on each of the things that we're recommending.

He's also left with an information kit which contains his audit results, some rather colourful brochures on how much your appliances are using, and some "how-to" information on how he can do the things we're telling him to do.

The audit takes about an hour and a half in the customer's home. It's done by appointment, and we've had a tremendous response to it so far. One of the great values I think of our program is that it's very specific, it's tailored to each individual home, and it's very detail oriented.

What most homeowners need is very specific advice. They've done the more obvious things. A lot of people have stacked a lot of insulation in their attic, and we'll see that when we get to looking at the results of some of the audits done to date. They've also done things like setting down temperatures, but what they need is advice on the detailed, little things they can do, such as weatherstripping around their attic access doors, how they can solve their specific problem of sealing up their type of window, and just the basic step-by-step suggestions on how they can do these things.

We also find there's a lot of value in giving advice on things that not all customers have considered doing, or have considered worthwhile doing, and that is like wall insulation, and particularly basement wall insulation.

We found that about 50 percent of the advisor's job while he's in the home is motivating the customer.

Another value of the home energy audits is that the homeowner accompanies the advisor around the home and you can point out then specific problems that you can see, offer specific solutions while you're looking at.

As I said, the audit takes about an hour and a half, and probably about 20 minutes of that is spent sitting down with the homeowner at the end and explaining your recommendations and explaining in detail how to do the things you're recommending.

An interesting comment I had from a company that's doing audits in the U.S. is that they ask their advisors: what was the most difficult part of doing the audit? And 80 percent of the advisors said the hardest thing is getting out of the house because the customers are that interested in getting the details of what you want them to do.

I think that speaks well as to the results of what we've done to date. It speaks well of the interest out there among homeowners. Now, fortunately, about the time that we were developing the audit program in Brampton, Ontario Hydro was also considering doing an audit.

I say fortunately, because they agreed to do a trial program in Brampton where, over a period of six weeks, we brought in six teams of auditors. We did about 400 audits over that period which is a lot more than I could have done in six weeks, and most of the results we have to date are from that trial program.

We hadn't done that sort of thing before so we didn't know what kind of response we would get, and we wanted to get quite a number of people involved. We sent out an explanatory letter and a reply card to selected portions of Brampton representing different heating types, different housing age, and so forth. We sent out 2,500, and we got swamped with a 20 to 25 percent response rate.

One thing we found was that electric heat has always been the most expensive, up until quite recently. They had R23 in the attic. Oil heat, which has always been slightly less expensive, had R22, and gas-heated homes, which are a little bit cheaper to heat at this point, had R21. I'd say that's within the range of the error in the sample that we did, but they were all very, very high, and that's why we found that we're probably missing the target if we aimed a lot of our efforts, in Brampton at least, at attic insulation.

The biggest area of savings actually we found was in the basement. The average value there is R2, and I'm talking here strictly of the insulation, not of the structural component.

We found that 95 percent of the homes that were heated with oil needed at least some basement insulation.

Identifying savings and accomplishing savings are two different things. So, in order to find out how much was actually done based on the audits, we did a follow-up survey and asked them toad done. We found that, of those who responded, 80 percent had carried out at least some of the measures, and another five percent stated their intentions to carry out some of the measures.

So we can assume that at least 85 percent of the people were motivated to some extent by the audit. Overall, we found that almost 37 percent of the measures recommended had been carried out, and the respondents stated that they planned to carry out another five percent of the measures that were recommended.

We got a lot of unsolicited comments sent with these letters, and some poeple went to the trouble of writing a whole page on the back of the letter telling us how nice they thought the audit was, which pleased me no end.

Brampton Hydro is continuing to offer audits. We hired a couple of students and we did another 120 audits last summer, and I'm continuing to offer them as I can.

Ontario Hydro has announced the Residential Energy Advisory Program which is based — at least in part, on the trial we did in Brampton — which would offer a free home energy audit and a $2,000 loan at a reduced borrowing rate to those who have the audit.

It is expected that most municipal utilities will opt into that program and therefore it eventually should be available throughout most of the province.

In Brampton, we have a proposal to the commission that we hire three people permanently just to offer home energy audits. We hope to be able to provide audits to more than 80 percent of the existing housing stock over the next 10 years.

By the tenth year of the program, we would hope to accomplish — in 1991 terms — the savings of $2.8 million per year. That's, I hope, conservative in that I would like to improve the effectiveness of the program over that time, but I still think that's a fairly considerable savings.

In addition to these savings, there would also be a fairly substantial amount of local business generated by this program if you assume that 33 percent of the people who are audited go out and do something.

It will mean a lot of business to local contractors and local supply houses, which I think could have a very good impact in addition to the savings to the local community. One of the ways of doing this is to offer low-interest loans to people who have the audit.

Another idea that's been tried in the U.S. is to offer a free kit of materials along with the audit, which is something we're looking at. For instance, to hand out some rope caulking, some type of weatherstripping perhaps to each homeowner that receives an audit, in order to give them some incentive to make it easier to do some of the measures we recommend.

Another idea would be to offer workshops to homeowners who've had audits, because the next stage after they've decided to carry out the measures you've recommended to them is how do I do it.

That would greatly increase the number of people who might act, especially on some of the more complicated measures. (In Brampton, the Urban Energy Centre, jointly sponsored, I believe, by the Region of Peel and Sheridan College, is offering a series of workshops to find out how to carry out the conservation recommendations.

Residential audits or surveys have been offered for several years in the United States and the U.S. utilities have been very, very helpful in telling us about the pitfalls that we can avoid in setting up this kind of a program. I'm sure we still have a great deal more to learn about how to offer this service, and I'm sure that this service will be very different in five year's time. There will be a lot of things included in the audits which are now non-economical or we just don't know how to offer.

But to date, even with the limited scope of this program, I found it to be a tremendously valuable service.

I believe our customers feel the same way about it from the response we've had to date, and I hope that it will be expanded right across the province and offered to all Ontario homeowners. Thank you.

Dr. Anthony Fuller:
Director of Rural Development Outreach Project at the University of Guelph, Ontario, Dr. Fuller's current interest is in research of rural planning and development, rural transportation, residential development, energy conservation and future trends.

The project that we're involved with at the University of Guelph is a prototype of a program to assist rural areas, in particular, to examine their problems and to organize local change and development.

In some cases, this turns out to be non-development. Communities or municipalities may feel they have some support in non-development as well, perhaps.

There are three things that we try to come up with in doing this work. One is that our work supposedly should remain innovative — that is, coming up with some new ideas at the university, some new techniques, to enrich and better the human condition — in this case, in a rural area.

Innovation has, as we've found over six years of doing this sort of work, two obvious areas of blockage. One can be innovative as long as we stay on the campus and we can innovate in front of our students and hopefully they may take something away with them.

But if one wants to innovate in a practical way, then there are two areas where conviction has to also take place. One, of course, is with the rural community itself, or the rural municipality representing the rural community, and often this is a difficult thing to do because rural communities, perhaps of all, tend to be more conservative and less likely to change rapidly.

Our second objective is to be sure that the community benefit derived from the work that we engage in with rural municipalities. Therefore, if we're interested in a community benefit rather than a private benefit, then the municipality is an obvious level at which we should be working — at which the public university in fact should be working.

Think of your university as a public institution supported by your taxes. Therefore, there should be some support coming back from the university directly to the people who pay those taxes assisted perhaps at the municipal level as well.

Thirdly, we endeavour to be integrated. You can change one thing in one little place thinking you're doing a good job, but it has to fit in to the rest of the rural system or the rural structure. And you can do a lot more harm than good if you tinker around with one piece without thinking about how it might affect the rest of the way people live and work and so forth.

Things have to be joined together, and this is particularly the case in a rural area where things are interdependent. They lock together much more solidly than perhaps they do in the city.

We worked over the last five years in Huron County, an agricultural area, and in Halton Region, a rural fringe-type area, and with native communities in Northern Ontario. We've done a series of need assessments to find out what projects are of interest to rural people and rural municipalities and rural agencies — both governmental and non-governmental.

Housing always appeared to be in the top three of whatever level of analysis we did — all aspects of housing — although I must say that housing for senior citizens was the foremost. Housing rode high consistently in all parts of the province where we worked, and it was very convincing.

On the other hand, nobody — nobody — mentioned energy conservaton. These surveys were mainly done in 1977, 1978, and one in Northern Ontario in 1979. Energy conservation did not occur in any of the scales of lists of needs in any of the rural communities in Ontario, which explains why the work we tried to do didn't take off very well either. But the timing wasn't right. We were a bit too early. Our innovation was in fact an innovation.

On the other hand, there were concerns which rural areas do have which are quite interdependent with the energy question and the housing question. People were and still are concerned about the loss and alienation of good agricultural food lands. People were concerned about physical services in rural areas and, to a lesser extent, about social services.

Groups and municipalities were all interested in transportation problems, but not from an energy conservation point of view. Transportation was required, rather than thinking about how to streamline and consolidate the existing transportation — the dependence on the private motor vehicle.

Fourthly, the area of concern, again at the municipal level, was around land use planning, particularly the public involvement in land use planning.

Clearly, looking at the energy conservation and housing side of rural life, there are two areas which are quite obvious. One, of course, is retro-fitting and dealing with the existing housing stock which, in rural areas, tends to be somewhat older, tends to be spread out, tends to be dispersed and, in some cases, quite isolated.

On the other side of the question is the new developments which could and will probably take place in some parts of the rural areas of Ontario, and the new housing areas, and how these might fit in to rural planning.

New houses mean more than mere design of rural homes. Important is their location in relation to services, to existing villages or settlements, to existing transportation, to jobs. In a rural context, space and distance are, if you like, the most characterizing features of rural life — of space and distance between people, jobs, services, etc.

We focused on the people rather than the things that people actually do, although we did measure some of those as well. We classified people in one small community according to their over-all characteristics of energy consumption.

To make this interesting to the community, we used school children as a way of doing this work, so the idea of energy conservation was implanted with youngsters. We divided up the people that we talked to and categorized them according to animal characters such as hippos.

The hippo was the big user. Hippos are large and reflect that grand scale in their electricity and heating fuel consumption — big houses, big cars and big families are their characteristics.

This was in 1979, and the average energy bill per household in this group was $1,219 — two years ago. We have a lot of hippos around in the rural area. And these of course are the rural estates which are characteristic of some of our urban fringe areas — 15 percent of the respondents have high fuel costs because most of these people are commuters, driving long distances to get to work, and this is in 1979.

On the other end of the scale, there are the church mice who have low thermometer readings in their homes, work locally, have all sorts of devices at home which use very little energy. We do have, in rural areas, far more of the hippos than we do of the church mice despite other characterizations.

Another study which turns its attention to new housing developments in rural areas was mainly undertaken by an architect-planner by the name of Charles Simon, and discussed and explored some alternative development concepts, again in the rural-urban fringe-type of environment, where there's a lot of demand for new housing.

I would suggest to people interested in municipal levels of energy conservation that there is the greatest physical gains to be made because, in this way, municipalities can deal with several of the energy and planning questions at the same time. They are, in fact, irrevocably intertwined.

Several new ideas came out through this study which you might find useful — building diversity, for example, rather than homogeneity, which characterized all rural building styles over the last years, emphasis on getting people back nearer to where their jobs are so you obviously reduce transportation costs, as well as all the other things that we've been discovering about rural life.

Clearly, to bring all these things together so new housing will have a solid energy conservation base, we're talking really a matter of planning. It's really as simple a message as I can say to anyone at the municipal level: your energy conservation policies and future lie in your ability to plan any new developments in your area, especially in those areas which are subject to rapid residential growth.

There's going to be greater emphasis — and there's no reason why this shouldn't happen in rural areas, just the same as it's happening in the cities — on cluster development and group forms of housing for obvious reasons. Clearly, new housing from our point of view would be always and first in the existing hamlets and villages, for obvious reasons.

Single-family dwellings on two-acre lots should become obsolete in rural areas because of the highly wasteful nature of the energy consumption, not just in the home or around the home, but of getting those people and that family into the everyday lifestyle. It's driving to Toronto, driving to the church hall, picking up the groceries, taking the children here, there, and everywhere. This may be very unpleasant, especially if a lot of you already live in one of those sorts of homes, but we'll think of it for the future.

New, technical systems can be made to use less water and to re-think our use of sewer systems and the whole need for massive and costly servicing in rural areas. Much of this could be alleviated and possibly revised with new techniques, and the opportunity to innovate here is enormous.

We should be putting a lot of this out to your universities to make them think about some new ways of getting these things done — if housing is close together and fairly concentrated.

And then, of course, there's the whole area of landscaping and the actual techniques and technologies which one can involve inside and around the home to take advantage of our growing knowledge around active and passive solar systems, landscaping, and so forth — the, if you like, cosmetics of energy conservation.

Right up to the last six months, rural people, and rural municipal workers and politicians, have had very little interest in energy conservation in any form at all that we've found. Therefore, I wholeheartedly endorse the need for educational programs.

I'd also suggest utilizing community groups — especially the younger people. We found that an awful lot of people said, "Well, I've been working 35 years, I've done okay, I built myself this home, and I ain't going to change now, not for you or anybody else", and I think it's only going to be through our children that we might get some new concepts really to be brought forward around efficient uses of our raw resources.

Further, rural planning is inseparable from the process of rural energy conservation. Our group is quite convinced that the only future way to bring about sound, rural land use planning and bring about energy conservation at the same time.

In the past, we've found, much to our regret, that rural municipalities have very little interest in energy conservation programs of any sort. What is difficult is to actually put this into a program, and that striking sub-committees or special energy task groups, in order to examine your energy prospects in your own municipality, involving the existing auditing possibilities and advisory services, — all are important.

And you shouldn't feel that you can't go to your local university or local college and ask them to give you some direct advice, as well as workshops, seminars, or whatever — there's lots of ways, and they should be responding.

That's an exciting topic for researchers at the university, so why don't you take your municipal problems to them and ask them to work on real problems rather than one in their heads, or through computer simulation. Give them the facts and figures from your own township or your own urban municipality and ask them to work on that. At the same time, those professors then will be helping students at the university to understand the energy question and will give you, perhaps, some direct information which will be very valuable to yourselves and to your planners.

QUESTIONS & ANSWERS

QUESTION: In your home energy audit program, have you discovered a desire of the people to read their meters?

I'm a hippo. I can't read, and I would like to become a church mouse.

MR. WOOD: We don't have quite the same problem in Brampton, at least not as severe a problem, in that on our bills we have a little energy management section which gives you the last 15 months of consumption based on the readings that we've done. So, fortunately or unfortunately, our customers have that information that they can look back on.

If you're interested in learning how to read the meter, you can get a very good little pamphlet from Ontario Hydro which explains how to read it. It's fairly straightforward and provides a chart so that you can keep track of your consumption.

We have found a lot of interest in doing that, mostly in industrial and commercial institutions in which we started some conservation programs, but also among homeowners who have, for instance, set back their hot water heater, or something of that sort, and want to see what the effects are.

QUESTION: I was interested to know what type of information they require a customer to provide them with before you agree to do an audit?

MR. WOOD: When we arrange the appointment, we ask for a couple of things. One is an estimate of your annual heating costs. That's just to give us sort of a rule of thumb to work from. We also ask that they make sure that their closets are cleaned out so that when we go up into the attic, we don't drop cellulose all over their clothes, which can be a problem.

When we go into the house, we spend the first 10 minutes sitting down talking to the homeowner. We ask them a series of questions about the house, how many people live there, how many showers a week do they take, because we calculate from that how much they would save by putting in a flow restrictor — that type of question.

Whether you've ever run out of hot water will tell us something about whether we can set down the temperature. We ask what types of appliances do you have in the house, and other specific characteristics of the house.

We've found cases where we're told that the old bedroom was particularly cold. In one case, we found the solution to that was that one of the kids had stuffed his teddy bear down the duct.

In another case, the ducting — it was a very inaccessible basement — had fallen apart, and they had a beautifully warm basement. You could have grown fruit down there. But the bedroom that that duct was supposed to serve was quite cool. so we ask a lot of questions about things that we can't ascertain just by looking at them.

QUESTION: Do you require people to complete a questionnaire giving things like the physical dimensions of the house or information asked for in the questionnaires that the federal Enersave people ask you to complete. I was wondering if you people had tried the questionnaire route to get that information.

MR. WOOD: We're testing that idea. If we can provide a questionnaire or a booklet to the homeowner which he can fill out and provide us with that information and then we could do the analysis for him, it would obviously be a lot cheaper. Whether it would be as satisfactory remains to be seen, and that's something we're testing. One of the problems is that, as I said, the audits that we're doing in Brampton and that Ontario Hydro is now doing, are very detail oriented.

We'll point out that you may not need weatherstripping, but you may have to move it so that it's against the door instead of half an inch away from it. If you have simply sent out a questionnaire asking the homeowner whether he had weather-stripping, you're not going to find that sort of thing out, so there's a couple of questions that we're looking at in setting up a trial for this.

One of these is the quality of information we're going to get back — whether the information is in fact accurate — and the other is, does it have the same motivational effect as having someone come out and go around the house with you and point out all the various aspects.

QUESTION: Before you do an audit, or during your audit, do you put much stock in the energy use per square foot that you might calculate?

MR. WOOD: Yes. It gives you a rule of thumb. If it's costing $1 a square foot, you know there's an awful lot more than if it's costing 33 cents a square foot. As a rule of thumb, that gives you some indication of how badly off he is, but there's an awful lot of difference if the person happens to have a cat that he lets in and out all the time or a couple of young kids, that will have some impact on his energy use per square foot. So there's a problem with strictly relying on that.

QUESTION: One of the interesting things I noted between Mr. Wood and Mr. Fuller was the degree of response or the way in which energy conservation is accepted in Brampton vs. a rural type of community and it's somewhat disturbing, being from a rural community, that there appeared to be an attitude that it's a conservative area; they're really not going to change, so let's go and try and deliver the message through the schools, through their kids.

But, unfortunately, by the time the kids get to a point where they have some say, they may have adopted conservative attitudes as well.

That's one of the disturbing things I've found from the talk, and I was wondering if there were any further studies at the University of Guelph, or that anybody else is doing, to try to compensate this lack of acceptance of conservation?

MR. FULLER: The question is an excellent one. It is, if you like, the summary of what I was saying. The question of educating a public which is not interested is what the average program is designed to try to do. We have several additonal experiments going on, not just on energy.

I suggest to you that some aspects of rural life are well entrenched. For example, it's quite clear to most of us working at the university in land economics and in farm practices that if farmers rented their land, then we'd have a far more effective farming picture and take away a lot of the anxiety.

Yet to say to a farmer to give up your land and lease it from a corporation or a government or some other body and just live there and farm for the rest of your life, but pay rent, and we'd get run off the land with a shotgun. So there are some ethics, some cultural things which are unmovable, and I don't think we should try to move those.

There's a lot of evidence in educational matters about people listening and doing something when they feel there's a crisis or when they feel it touches them personally or when it touches them in their pocketbook, so we got geared up in 1979 because we were told by our energy planning people in Ottawa that there will be a home fuel oil shortage in the winter of 1979.

But because Pierre Trudeau and the Liberals were out of government for that six-month period, there wasn't a shortage at all, and the gasoline prices didn't go up, so our planned program of education in rural areas fell on deaf ears because nobody was paying any more for anything — nobody ran out of anything — nobody got scared to death about anything.

The Americans are running around like mad because they're scared to death because they do run out of fuel oil and they are paying enormous prices at the fuel pumps. That hasn't happened to us yet, so, unfortunately, education or believing in something and doing something about it is linked to a sense of personal need.

I suspect the time is ripe again, and I'm glad to see these other programs are in place to get people moving. The only thing I can suggest that the municipality people might think about is that there's quite a value in demonstration.

Progress in farming, which has been amazing over the last 80 years in terms of the techniques, has been a lot by demonstration. In other words, the diffusion of innovation takes place by looking over the garden fence and seeing what the next guy's doing and when he seems to be doing okay, then you start to do it as well, and eventually everybody in the community is doing it.

Leadership then becomes an important thing. Somebody in your municipality has got to take the leadership and I can't see as far as energy conservation goes, that it shouldn't be the municipality that sets out to demonstrate its good faith, its long-term thinking, despite only being around for two years or three years.

But let's be thinking of 2001 and put something into our municipality which will, over time, show people that even you as politicians, or you as municipal planners, are doing your own thing in your own firehall, your own city hall, your own churches.

LUXURY RENTAL
ACCOMODATION
NOW RENTING

Section H

DEVELOPING COMMUNITIES

23 Residential Infill Development

Peter McInnis:

A partner in the Toronto firm of Klein & Sears, architects and planners, Mr. McInnis is an urban planner who has recently completed a study of the potential for infill development in small and medium sized Ontario communities.

Basically, my remarks are going to be geared around a report that I did for the Ontario Ministry of Housing in 1980. That report dealt with the opportunities and constraints for infill housing in small and medium sized Ontario municipalities.

The 1980's are going to be a time when it will be necessary to concentrate on making better use of our existing resources. In urban planning and development terms this will mean trying to use the existing urban infra structure such as roads, schools, and sewage systems more efficiently and effectively as well as accomodating future growth and more energy efficient land use patterns.

One urban development concept which is not a new concept but has received considerable attention over the past few years and which is directly relevant to the issue of making better use of existing resources is the concept of infill development. Simply stated, this concept involves the development of new structures on vacant or nearly vacant sites within older, built up parts of urban areas. Recent popularity of this concept is part and parcel of the more general positive attitude towards downtown areas that has been developing throughout North America in the past few years, particularly in metropolitan and other large urban centres.

Downtown areas are now being seen as more attractive places to live than they were in the '50's, '60's and early '70's. In part this is due to the savings in transportation costs that can be realized by moving closer to one's place of work and is, in part, due to changing demographic characteristics. Fewer and smaller family type households are being formed and consequently less emphasis is being placed on the traditional family-oriented amenities that are normally an important factor in the residential location decision. Attitudes towards the downtowns of many Ontario municipalities also have been undergoing change. In part, this change has come about as a result of the importance that governments including the government of Ontario have recently placed on downtown revitalization through a series of policies and programs aimed at the conservation and preservation of historic buildings and the upgrading of services and facilities in the downtown areas.

Relatively little research is available, however, dealing with the opportunities and constraints or the benefits and costs of infill development. Similarly, little information is available on special planning and design implications and requirements related to various forms in infill development. Much of what is available is oriented towards large urban centres and is therefore not directly relevant to most communities in Ontario.

In 1980, as I said, the Project Planning Branch of the Ministry of Housing initiated the study I am reporting on to examine, in a preliminary way, the opportunities and constraints related to infill development in small and medium sized municipalities under 100,000 people in Ontario. The study focused on what are conventionally known as the core areas of municipalities, including the central business districts, and the transitional areas immediately adjacent to these districts.

The study was concerned with infill development involving a range of non-industrial uses. Particular attention was directed towards the potential for residential and mixed residential and commercial forms of development. The opportunities and constraints examined were in terms of: 1) the amount of vacant or nearly vacant land available in these areas; 2) the environmental characteristics of these areas; 3) the capacity of existing services and facilities; 4) official plan policies and zoning by-law restrictions, 5) current and projected market demand for residential and commercial uses; and 7) last, but not least, economic viability.

The study was carried out in twelve municipalities: Belleville, Brockville, Cambridge, Chatham, Oxbury, Kenora, Leamington, Newmarket, Paris, Sault Ste. Marie, Timmins and Woodstock. These twelve municipalities were selected to include communities of various sizes, and to obtain representation from all five of the major geographical regions of the province. In addition, and this is an important factor, the selection was limited to those municipalities where it appeared there will likely be at least some modest growth over the next few years.

The major findings of this analysis are as follows. In regard to the amount of vacant land available, there is a considerable amount of both public and private vacant or nearly vacant land in the core areas of most of the municipalities that we surveyed. In addition to this vacant land there is also a considerable amount of land that is suitable for redevelopment. The vast majority of the publicly owned vacant land is currently used for surface parking, while the privately owned vacant land in most cases was serving no obvious function. Almost all the land identified for redevelopment is privately owned, consists mainly of sites with abandoned or underutilized buildings,and certain heavy industrial uses that officials felt should be relocated. Basically, the conclusion to be drawn is that there is vacant or nearly vacant land in the core areas of many small and medium sized Ontario municipalities.

In fact, in some municipalities surveyed, the amount of vacant land was considerable. A case in point — the city of Cambridge, according to our estimates, had at the time in excess of 15 acres of vacant land in what we defined as the core area. Hypothetically, if this land were developed for apartment residential uses at an average density of, say, 25 to 59 units per acre, the resulting development would yield some 375 to 750 dwelling units. Conversely, if this land were developed for retail commercial uses at a density of 1 times a site area, the resulting development would more than double the existing retail space in the core area of Cambridge.

It's important to point out that the identification of vacant land in these areas doesn't necessarily equate to the identification of infill development potential. Some of the vacant sites identified during the field invetigation were located in areas which are not particularly well suited for residential development. In some communities the market conditions or the local attitudes are such that new core development may not be an economically attractive investment. In other communities, local officials would likely be very reluctant to see their municipal parking lots developed for other uses, even if these new developments include public parking facilities.

With regard to environmental characteristics, generally speaking the core areas of the municipalities we looked at have many environmental features which make these attractive places for new commercial development and certain forms of new residential development. In some municipalities this environmental attraction potential is in part due to the recent efforts on the part of local councils, businessmen, and the province to revitalize downtown areas.

Whether or not residential uses would be viable on vacant sites in core areas depends in part on whether the core areas or parts of them could be considered suitable as new residential neighbourhoods or extensions of existing neighbourhoods. While the actual core areas do contain a substantial amount of residential development and are not residential in character, the close proximity of such uses forms a good base for extending certain types of residential uses into these core areas. Again, on environmental characteristics, the viability of the downtown retail area significantly affects the potential for creating a suitable environment for additional commercial space or for introducing new residential development into these core areas. Where the retail activity is brisk and successful, the core is more likely to have life and to be regarded as potentiallyattractive living environment. Where the downtown is seen as quiet and dying, it is more likely to be perceived as an uninteresting and unlikely place to live.

Most of the municipalities that we looked at had adequate service and capacities in their core areas to accomodate significant amounts of new development with few or no improvements to these services and facilities. A number of local officials believe that, in most cases, new infill development would probably cost the municipalities considerably less money than equivalent suburban development in terms of the capital and operating costs of providing a full range of municipal services.

With regard to official plans and zoning bylaws, while most of the official plans studied do not deal in a creative or forward-looking way with development opportunities in the core areas, specifically regarding the concept of mixed use projects, neither do they represent major constraints to innovative forms of infill development. Most official plans would not likely need amendment to permit a variety of new uses and mixes of uses in these areas. On the other hand, zoning bylaws were found to be far more rigid and retrictive in terms of the opportunities they provide for new development in core areas, particularly with regard to residential and mixed residential and commercial uses. Most zoning bylaws require amending at least to bring them into conformity with official plans. In many cases, they should be throughly reviewed in terms of design and development control methods that they currently use.

We concluded that, despite the fact there appears to be a very limited amount of new office space available in most municipalities, local officials and others including real estate agents indicated the current and likely future demand for such space is very modest. In contrast, most municipalities have a stable, and, in some cases, a fairly strong demand for new retail commercial space in their core areas.

The market for single family, owner occupied dwellings has fallen off dramatically, as we all know, in many communities over the past couple of years. However, there appears to still be a fairly strong demand for multiple rental accomodation, in some cases, condominium, for all types of households and income groups.

Finally, of all the opportunities and constraints related to infill development, economic viability is the most difficult to assess. Viability of any project is a simple function of the costs of development, i.e. land and construction costs and operation compared to the likely rents that can be realized from the project. Generally speaking, new retail uses appear to be economically viable in many communities given current land costs and market rents. Office and residential uses, particularly rental housing, appear to be generally less viable.

Local officials in most municipalities we looked at displayed a very positive attitude towards their downtown areas and towards revitalization through rehabilitation and new development. In many cases, officials indicated that their councils would bend over backwards to attract and encourage new development. At the same time, this study found little concrete evidence, particularly in the small communities, that local officials had a good understanding of the economics of development or of the concept of mixed use development or ways to encourage new development downtown. Further, officials appear to have had little confidence in local developers' abilities to underake or, for that matter, come up with creative development projects for vacant sites in core areas.

Considerable, albeit widely varying potential exists for infill development in core areas in many small and medium size Ontario municipalities. In short, the opportunities for such development appear in most cases to outweigh the constraints.

Carolyn Kearns:

A partner in Peter Barnard Associates, a small, inter-disciplinary company specializing in management, marketing and socioeconomic analysis. Ms. Kearns is an urban and regional planner and a lecturer in urban studies at Atkinson College of York University in Toronto.

The focus for my remarks today is from a federal study that was done for the Canada Mortgage and Housing Corporation. I should say it was completed for them but started for the Ministry of State for Urban Affairs back in 1977. At that time the whole concept of infill development was relatively unknown and certainly unstudied. By the time we finished in March of 1981 the topic was well known and well studied. While these remarks have been geared to the federal perspective, they are substantiated by a very recent study that our firm completed for the project planning branch of the Ministry of Municipal Affairs and Housing which is a follow-up study to the one that Peter McInnis has done and which did address the whole question of economic viability. Simply stated we found that while there was tremendous market opportunity and our work in Cambridge and Sault Ste. Marie supported everything Peter has said, the economics of the thing in today's current market rate just doesn't work.

Our work has focused on a specific type of development form. Our definition was "sensitive infill" and by that we meant residential development on vacant or underutilized land parcels requiring little or no demoliton. The sites had to be less than one to two hectares in size and new development must be compatible in height, scale, form and price with the existing neighbourhood. To be sensitive, the project should not exceed four storeys, or thirty units. And finally, again to meet the definition of sensitive, the projects should not be in and of themselves sufficient to change the character of the neighbourhood. In trying to stick to that definition we were forced to exclude many things which would have perhaps increased economic viability and we were forced to not look at projects that didn't meet these requirements.

The initial research suggests that, really, the interest in sensitive infill development has come about as a result of three major factors. First of all here is the slowdown in growth, an obvious reason for looking at smaller scale and concentrating on what you've got already as opposed to continuing to look on the outskirts of a municipality. Secondly, the emphasis on conservation, a very important trend which has encouraged sensitive infill development. Reuse of existing urban areas suggests more efficient use of existing resources including land and energy. In addition, most municipalities have both hard and soft services available to accomodate the type of development which we were certainly considering. And finaly there is the interest in neighbourhood revitalization, particularly in the larger municipalities which certainly was filtering through to almost all municipalities with any form of urban fabric.

In accomodating new growth, another important thing to keep in mind is that infill is only one of several growth alternatives. I think it's unrealistic and even foolhardy to suggest that infill is going to solve the municipalities' total housing problem. It will not and can only succeed if it is used in conjunction with several other types of development. And those are, first of all and impossible to overlook, suburban development. It's got a proven market, it's still thriving, and, although the true costs of this type of growth are often unknown, given the existence of predetermined services there is a strong vested interest in this form of development on the part of both the developer and the municipality. Secondly, redevelopment is another option for housing growth, and at this point it seems to have met with mixed results, largely due to the fact that it does change the scale and character of the area in which it occurs. A third way of accomodating new growth is rehabilitaion and coversion: while upgrading a neighbourhood it can also change character significantly, often displacing existing residents. And fourthly and finally, large scale infill, which is anything that exceeds the four storey, thirty unit, one to two hectare kind of definition we were working within. Municipalities, I think, have to employ certainly two or more of these types of strategies in housing.

One of the most important things to stress, getting into the whole question of economic viability, is that it really depends on whose viewpoint you're looking at. What works for one interest group might not work for another. Specifically, there are four viewpoints which we've looked at. The first is, the private developer. Quite simply he just needs to know that there's a market demand for his project and a profit to justify his effort. As well, compatible standards and a clear approval process to follow will certainly help him in his decision whether or not to invest in a municipalty.

The public developer, as the second viewpoint, is really concerned more with the fit between the location and the neighbourhood for the project and the client group which he is trying to service. Hence, one of the reasons for our strict definition as we were working for a public developer. He usually is working to a fixed maximum unit price and often undertakes projects with other agencies to realize overall goals.

Thirdly, we have the householder, or the homeowner, who must perceive the infill neighbourhood as a desirable place to live. Interestingly, our research has shown that concerns of personal transportation and householder costs, namely mortgaging, heat, taxes, are not as important as the specific features of the unit and the neighbourhood in which that unit is placed. That was a rather crucial finding.

The fourth perspective is the municipal perspective. Simply stated again, infill should not add to the capital and operating costs and, if anything, should reduce them to be highly desirable. Often the type of cost-sharing arrangements proposed influence the type of development which is accepted within the overall municipal goal of encouraging neighbourhood revitalization.

Finally, in the whole question of economic viability, you have to look at the physical opportunities. While most municipalities have physical opportunities of one sort or another there's a great variation in the amount of land available and its desirability.

Our main work was an examination of three cities. We looked at Winnipeg, St. John's, Newfoundland, and Toronto. We looked at them in that order, and the results present an interesting pattern.

First of all, in Winnipeg, we were delighted to find a tremendous physical opportunity and a product we could bring on the market for what we considered to be a very affordable price. This was done in 1979.

We could bring on a basic, very small, single detached unit for $50,000.00. The problem was that we couldn't sell anything in a comparable neighbourhood for much more than thirty-five. So what looked to be a great opportunity physically and economically from our perspective, from the developer's perspective as well, turned out to be a bomb from the marketing perspective. The developer, if he was careful, could be cost competitive within about 15 percent for townhouses, small detached units and low rise apartments if he concentrated on vacant or medium sized land parcels in middle income, very stable neighbourhoods. However, the units were only competitive in these more established areas as they were extremely small, very standard and, as I mentioned before, became difficult to market.

The householder was slightly better off financially in a multiple unit infill townhouse with savings as high as 30 percent but those savings were due almost entirely to the hypothetical belief that a homeowner could move in from the suburbs, sell off a house, or sell off a car, and realize savings of anywhere from $2,000 to $3,000 a year. Without selling that car, those savings of 30 pecent would not be as great.

In Winnipeg, the municipality was much better off financially if it encouraged non-family infill development. If it concentrated on trying to replace existing type housing with units for similar profile families, it ran into increased costs which weren't as attractive.

St. John's was the most positive case study that we looked at from our perspective. Infill was found to be viable no matter who was doing it and no matter what group. The developer had costs which were competitive regardless of the project size or the unit type and that was due to the buoyant market, escalating prices, and low vacancies which were experienced in the city. This work was also done I'd say about a year ago, just before interest rates started to take off and just before the oil surge really hit St. John's. As in Winnipeg, the low land and construction costs meant that the product could be brought on the market for an affordable price. The difference was that people were starting to move back down into the downtown area which meant that prices were starting to rise for existing housing in the core. For the householder, as in Winnipeg, there was a potential savings for up to $2,000 annually and, again, it was due to personal transportation savings resulting from the sale of one car. All other householder costs such as property taxes and mortgaging were roughly equivalent between the core area and the suburban area we compared. The municipality in St. John's clearly benefitted under this scheme.

Toronto, ended up as a bit of a disappointment to us. Infill in Toronto is tremendously successful but not in terms of the existing neighbourhood type residence and the existing form and scale that we were looking at. Infill has been almost too successful to the extent that the kinds of things that we were looking at were working very well here five and six years ago. Toronto has now exceeded beyond that point to a stage where infill is only there for the luxury and more higher income groups, witnessed by the fact that the city is now not doing more than two projects which would meet our definition of sensitive.

I would like to conclude with six findings that our work suggested. First and foremost, it will work only if it's one of several development choices. Secondly, there are tremendous physical opportunities that do exist for infill in almost any municipality and these should be looked at carefully. Thirdly, success will only happen if there's very strong local support and often financial incentives provided by the municipalty. Fourthly, that infill projects can be economically viable when compared with suburban development in growth areas where there is a strong housing demand. If you don't have growth and if you don't have a housing demand in the area you're looking at, you might as well forget infill economically. Fifthly, there's a strong rationale for municipal encouragement of infill. It makes sense for municipalities to be looking at it. They can stand, if they are doing the right kind of infill, to realize tremendous financial gain. Finally, there are several methods for promoting infill, one of which is this kind of session. Municipalities who are interested can take relatively easy measures by adopting the kind of zoning and official plan policies that Peter was talking about. They can participate as well in the available provincial and federal government programs and at the same time they can take financial commitments, such as dedication of land, or giving over land that had been in tax arrears. No matter what a municipality does to promote and encourage infill, it's got to be flexible and it's got to be the kind of thing that can be worked out throughout the process fairly easily and conveniently for all parties concerned.

Bob Truman:

Mr. Truman is a planning consultant and a former employee of the City of Toronto and of the Borough of Etobicoke. He has been involved in a study of building code enforcement in Detroit, the preparation of plans for the Metro Toronto area and in Ontario Municipal Board hearings. His company is Truman and Jennings, Toronto.

The conditions for infill development occur when a site or any urbanized area is originally developed at an intensity or a density which is too low in the light of later conditions. It's an historic process. One of the earlier ones in Metro will serve as an example. This particular site is in Etobicoke. The buildings probably date from 1870 if not a little bit earlier. Originally the area was a farm settlement but as the area became more attractive as the crossing of the Humber River and the Dundas Road and because the Humber River was navigable up to that point it became a very attractive location. As a result you have the situaton where there were houses built along the road and later, in the back, filled in with additonal properties. The site also had the advantage of people being able to throw their garbage over the banks down into the Humber River about 75 feet below. For a number of reasons it was an attractive development and an attractive area.

I'd like to zero in on five more recent projects. The first that won attention, or some might say the noteriety in Toronto, was the Dundas-Sherbourne area site. Dundas and Sherbourne would be a part of town, on the eastern fringe of downtown, which is now very attractive as a residential area. At that time it was an area which the Ontario Housing Corporation and, prior to that, the City had seen as an area that was going to be redeveloped. A redevelopment proposal for this site, essentially a high rise Ontario Housing Corporation building, was the proposal that sparked a fight that ended in the development called the Dundas-Sherbourne Development. This is, I think, more of an architectural exercise than anything. One of the attractions to people in the municipal environment to infill projects is that often times they call forth a fair amount of creative architecture. Whether the architecture results in a good living environment, I suppose, is arguable in some cases, but I think, in this case, this is a very nice looking project.

I think of all the criticisms that one might hear about this project, possibly the one that is most often heard is that the lanes in the city have typically been used for service and for traffic. The success of this project, or let's say the ability of this project to achieve the density that they had to achieve, meant that the rear lanes had to be used too intensively. For example, the lane is used by other houses on the next street to the east, and the chance for danger of children coming out of this project into the lane is fairly great. There are other criticisms: I don't think it necessary to go into them, but one of the things this project did was to give rise to the idea of taking the density that might be appropriate in an urban area and laying it on its side. Maybe we can bear that in mind for a minute while we go onto the next project.

This project is on the north side of Gerrard Street just east of Church Street. Again, for those who may not know Toronto well, I would call this a solid downtown location. There were originally four structures on this site going over to a very high density residential building known as Neill Wycik College which, while not owned by Ryerson Polytechnical, is very much related to that institution. At the time there were a series of four houses that went over to the last one of which abutted directly against Neill Wycik. These houses were considered historic, in part because they appeared in a Lorne Harris painting which happened to be on display at the Art Gallery at the time this particular rezoning application came through.

PETER MCINNIS: In addition to being a planning consultant, I also happen to be a developer and I'm going to discuss a project that we're currently doing at the moment, and it is about as infill as you can get. We term it a sensitive infill development. It's located in the midtown Toronto area. For those of you who are not familiar with Toronto in a detailed way, it's in the Bloor Street, Avenue Road area knows as the Annex. It fronts on Avenue Road.

We started out by purchasing an existing land assembly and, as many of you know, lot or property boundaries in old parts of cities are by no means regular. Two of the properties were roughly 200 feet deep. Others range from 100 to 150 feet in depth. The project we designed and are about three to four weeks away from completion involves the renovation of four older buildings, for approximately 8000 feet of commercial space and 6000 feet of rental residential space. In addition, we are building nine townhouse, each with a 25-foot back yard over anunderground parking garage with 17 parking spaces.

The project was built at roughly 60 percent of the allowable density and because of the nature of the project and the density, we received very favourable reactions from the residents during the approval process. That's important to point out because the residents in that area, known collectively as the Annex Ratepayer's Association, are perhaps, if not the most, one of the most active and vocal groups in Toronto. However, as we found out, the problems really didn't start with the approval process but more with how you build infill projects.

I think there are some very, very important lessons to be learned by people involved in planning and development work in municipalities when you're dealing with infill. It's not an easy construction process. You're dealing with extremely tight sites with very limited access for construction. Also you're building cheek by jowl with existing back yards. I'll let Barry note some of the problems that we encountered.

BARRY ROSE (Annex Resident): It is very difficult when you live next door to a construction site to establish a fairly friendly relationship with the person that's doing the building. One lane in the Annex was exactly 10 feet wide, so if the truck bringing in a huge garbage container was in that lane at 7 or 8 in the morning and you were trying to get out to catch an airplane, you're pretty well out for lunch. Tranby Avenue in the Annex project is something like 18 feet from curb to curb. Therefore, in the rush hour in the morning, traffic would come down Avenue Road, turn onto Tranby and there would probably, for a very good reason, be a truck unloading building materials into the construction site, so all the people that wanted to get downtown started to honk their horns.

The residents supported this 100 percent for a number of reasons. It was going to improve what was an extremely rundown site with an old graphics shop, a lot of noxious uses — and an unappealing site. One of the major reasons, however, was that the people that lived in that area were aware of a development to the south and they would rather see a development like this one than the other's porposal of a 22 storey condominium anchoring the corner of Prince Arthur and Avenue Road. The residents had a very selfish interest in seeing that this development went ahead, and I think that it produced a lot of good faith between both parties. That good faith, quite frankly, deteriorated over the year.

The construction started almost a year ago now. We thought it was going to be through in the spring, and as Peter said, they'll be through in three or four weeks. But I think, if there is one lesson learned for a person that's undertaking that sort of development, that is relations with the community. So many of the little incidents that blew up beyond what they really should have been, were due to lack of communication and a lack of good community relations. If you're going to close the street or close the lane for two hours to do something, you know it doesn't take any effort to send a little flyer around to everybody to say that's what you plan to do. If you're running behind, let the neighbours know. What started off as a very positive thing for residents turned to the point where we got a work order that stopped them building for six weeks. At today's interest costs, that's a pretty heavy penalty to impose on people. However, it got to that point and it was very unfortunate. Peter, maybe you'd like to tell us what the perspective was of the developer who was sitting there trying to get this place finished.

PETER MCINNIS: When you're building on a tight site like this, you can't predict what's going to happen from one minute to the next, or from one hour to the next on the site. Hence, you get the kinds of tie-ups in traffic to which Barry is referring. I don't know whether there's any way around that. I think the lesson to be learned, as Barry said, is to improve communications to the point that the developer is able to foresee what is going to happen and communicate that to residents. However, I think there are lessons to be learned for people involved in municipal governments and municipal planning offices who must understand that this is going to happen and to anticipate those problems and let people know ahead of time that it is not going to be an easy process. In this way a lot of problems can be overcome. I don't think Toronto is to the point of fully understanding the implications of constructing on tight infill sites. But it certainly is an important lesson.

QUESTION: What did your local fire department feel about having buildings built so close together?

PETER MCINNIS: We had absolutely no trouble with the fire department. The City of Toronto fire department is getting used to people coming in with crazy requests and is quite used to providing service or designing service requirements around very tight and complicated situations. It went through very quickly. We have a fire hydrant in the middle of the courtyard.

QUESTION: If you go outside Metropolitan Toronto, say to Ottawa downtown, five minutes walk from Sparks Street, you can still buy houses for $65,000.00. Now, it is impossible to do any infill there. The question is how do you do it in the ordinary municipality, where the land prices are low and people won't pay more than $70 or $80 or maybe $100,000.00. I'd really like to hear something from the panel, who are the whiz kids in the game, and whom we have to learn from.

CAROLYN KEARNS: I think you hit on the fundamental problem of trying to realistically build infill anywhere outside of probably three cities in Canada. The study we just finished for the Project Planning Branch, Municipal Affairs and Housing, found tremendous market potential and strong physical opportunity but we couldn't make the economics work under conventional financing. What we're doing in an effort to answer your question is to go back over that initial work and to try to look at some fancier forms of ownership — syndicated MURBs and some current things which are not being done in these cities and might never work but which might make the development economics more sensible.

QUESTION: Is anybody looking at the infrastructure saving costs to the municipality, because they must be, if somebody really looked at them. For instance, in downtown Ottawa, there are about five schools, all of which are half vacant but there are new schools having to be built in neighbouring Connaught and elsewhere. There's got to be a potential for substantial saving in new teachers and the efficiency of the classroom system and the use of libraries, the use of the bus system and all those sorts of things. It strikes me that one might be able to justify municipality getting into it and certainly CMHC and the province getting into the business. As they do, with co-ops, limited dividend municipal housing, subsidized units of various sorts, we really are making a saving. Is anybody looking into that, does anyone know?

CAROLYN KEARNS: We looked at it in our federal study and, in the two cities that we looked at, Cambridge and Sault Ste. Marie, you're quite right. Education's a bad example because if you get into the type of people actually moving into infill units, they're not families with children so you've still got a depleting problem. But it's a tremendous saving for physical infrastructure. Our work in Toronto showed that the five or six projects we looked at had not incurred a single municipal service cost, not even for a road improvement, that we were aware of. The savings can be, I believe in St. John's, as high as 27 percent by building in the existing area. That is difficult to do because you don't know which savings to include. If you included all provincial and federal grants that are provided to extend services into the suburban areas the savings could be even greater. But we looked at probably somewhere between 25 and 30 percent in the Toronto case.

PETER MCINNIS: On the issue of economic viability, I think we have to put things in perspective. Nobody is building in Ontario right now. It doesn't matter whether it's Toronto, or Kitchener, or Hawkesbury. Interest rates are so high and the market is so bad that even people in Toronto are not initiating new projects at the moment. I wouldn't want to throw the baby out with the bath water and say that just because we've got high interest rates and the market is bad that infill is not economically viable in smaller communities. I think there are some attitudinal problems that have to be overcome in smaller communities.

I'm not convinced that the market is, for residential, in the downtown. There is a very strong market, as I mentioned, for residential accomodation in small towns, particularly of the rental variety, for all incomes groups. But there is an attitude that exists in small town Ontario that you've made it if you don't live downtown or you haven't made it if you do live downtown. I think that kind of attitude has to be overcome before any investor is going to put money into the downtown for infill development, particularly of a residential nature.

I just say that to caution you, but I still think there is a very good likelihood that a number of projects in areas that are experiencing at least some modest growth and anticipating much greater growth will find there is a market that will be economically viable. Also I think there's a role for government to play in establishing precedents. In many of the downtowns we looked at, there was a need for some kind of initiative to turn around an area. In all likelihood a private developer or a private investor is not going to take that initiative as the risk is too high.

There are opportunities through various government programs to get housing into the downtown through cooperatives. There's also the possibility of helping to turn around the image of the downtown by building new cultural facilities in these areas to help change the image. I think the whole economic viability question would be helped by government stepping in and showing the way, at least in terms of setting some precedents.

BOB TRUMAN: My experience has been that infill becomes a reasonable concept where there is a natural demand for some additional development in a given area;also where that natural demand which could be satisfied by a high rise, or a more intensive project cannot be because, perhaps, there's a historic resource on the site that needs to be retained. So I think those are the two conditions that have to exist wherever anybody even contemplates encouraging infill.

QUESTION: Has anyone ever addressed the problem of utilizing isolated infill sites when they don't conform to existing bylaws, zoning and official plans? I think we're missing a lot of opportunities in that respect if we don't, but I don't think that anyone has ever addressed that problem.

BOB TRUMAN: I think that all of those projects that I showed, (I'm not sure about the Dundas — Sherbourne project) all required some kind of Amendment to the bylaw, and sometimes to the official plan. I think those are always justified. If you are looking especially to save a historic resource, you should probably be willing to look at any project on its merits because, as a planning objective, the saving of historic resources is certainly as important as landscaped open space or coverage or other matters. On the question of historic buildings, use comes into play. There are historic buildings in the middle of Toronto that you can use only for residential purposes, when maybe two blocks away there's a commercial structure. That strikes me as not proper. Depending on the circumstance, I would agree with your point that you should look at each question on its merits, if you know what it is you're trying to achieve. If you're trying to preserve a historic building, for example.

CAROLYN KEARNS I could add a couple of comments based on our experience in Winnipeg and Toronto. The Winnipeg experience: we got into trouble because most of the downtown residential areas we looked at were zoned and included with official plan policies for a much higher density and often for a different type of use than residential. That made the land very costly, and made it not surprising there was not one private sector infill project there. Clearly, there would have to be changes for infill to take place in the City of Winnipeg inner city neighbourhoods. In Toronto, the infill developers we were talking to, the guys that were putting up 10 and 15 unit projects, would not go into an area that required a zoning change. They would only deal with minor variances through the Committee of Adjustment. The simple reason for this was the uncertainty and costs in zoning changes which were too dangerous for them to risk.

QUESTION: One thing not mentioned is suburban infill. Suburban type development is largely underutilization of land and servicing which makes servicing much more expensive, absorbs a lot more prime agricultural land, extends the perimeters of the urban environment and that sort of thing. There's a lot of concern about low density suburban developments. To increase density, for example, in suburban areas what kind of infill development would be appropriate?

CAROLYN KEARNS: In Toronto, we started out on that study saying, 'great', this an opportunity for all those guys living out in Richmond Hill and parts beyond to move back downtown. We found there is, in fact, an infill market out there. While I say infill does not work in the City of Toronto in our definition, it works wonderfully out there. North York has some excellent examples of infill. I don't know if that's doing justice. I'm sure anybody from North York doesn't want to be called suburban, but the type of infill that's working there is single family housing, which is punched through back lot severances and it's working extremely well. We're finding people are not coming back into the city from outside the city. People moving into city infill projects are from the city. People moving into North York infill projects are from North York. So there is a slow trend towards increasing density in those outlying areas.

PETER MCINNIS: One of the difficulties with suburban infill is that you have a very rigid architectural form in the suburbs, albeit it's low density. I think it might be a lot more difficult to mix and match different housing forms and different densities in the suburbs. In downtown areas, you've got, even in single family or semi-detached neighbourhoods, extremely tight conditions by comparison with the suburbs.

I want to make a comment about official plans that I didn't refer to in my remarks on zoning bylaws. One issue that has to be looked at with regard to infill in downtown areas of smaller and medium sized municipalities, is the issue of parking. Municipalities, we found, generally haven't revised their parking standards, commercially or residentially, for years. They haven't looked at what the requirements might be, we found, generally, they're extremely high, and most of the public owned land we identified as being vacant was public parking lots. I think there's a tremendous opportunity out there, not only to re-examine parking requirements, but also for municipalities to re-examine the current process for providing municipal parking, and whether the serviced lot is the right route to go. We only found one or two examples of actual parking structures in the municipalities we looked at, but a lot of serviced parking lots. There are some precedents in Toronto for building municipal parking lots with housing above them and I think there is an opportunity in smaller municipalities, for municipalities to enter joint venture development

24 Mixed Use Developments

Michael Kohler:

A partner in the architectural practice of Craig, Kohler, Dickey and Edmundson of Ottawa. Over a 25-year career, Mr. Kohler has designed a large number of buildings of all types including apartments, senior citizen units, single family homes and schools. He is a Fellow of the Royal Architectural Institute of Canada and a Director of the National Board of Practice.

This forum is directed toward housing renovation, energy conservation, and other development issues. This panel addresses itself to mixed-use development. I suggest that mixed use can mean both a development containing buildings of different identifiable functions such as a mixture of housing, retail, commercial, and recreation, or a building which serves different functions at different times — a shared use building.

I wish to propose to you, that in the years ahead, we must make changes in our social attitudes, financing systems, and provincial and municipal legislation to make both types of mixed use development possible. There are two compelling reasons.

The first is energy conservation. It no longer makes sense to drive a car from a typical suburban home to the nearest store — some may be half or a mile away — or to provide a bus service to transport people to downtown offices.

It makes no sense to extract heat from an office building to keep it cool, and throw it away out of the window, and at the same time use energy to heat the community swimming pool.

It makes no sense to maintain heat in a high school gym to be used in the daytime, and continually warm a community hall just for use at night.

The second reason is financial. There are increasing demands on our cash resources for social services. On a government level, our tax dollars are needed to provide health care, pension plans, welfare, day care, and educational programs.

On a personal level, we seem to use more of our own money on recreation, travel and entertainment. The percentage of our income available for capital construction is reducing, and will continue to do so. We must limit our expenditures on roads and services by careful planning of the course of our cities, and avoid the construction of underutilized duplicate facilities.

As an architect, I've seen wasted energy and resources which could have been avoided by mixed-use development. Two years ago, the minister of education opened a high school just outside Ottawa. The ceremonies took place in a very large library. And two weeks ago, the minister of culture and recreation opened on a site 400 yards from the school, a new branch public library. Does it make sense to build two similar compatible buildings so close together? Does it make sense to heat both these buildings on a 24 hour basis? And can we afford the capital investment required for both these structures?

I've tried to understand why so few mixed use buildings have been built over the last two or three decades. Looking back over the centuries, we discover many fine examples. In Roman times the forum provided facilities for sports shows, theatres, retail and residences; in the 17th century we have Lesalle in Paris; and in the 18th century, the Burlington Arcade in London, with its fine interior shopping mall, with offices and residential units. In the 19th century, we have constructed miles of main streets across this province, with apartments over stores. There are still some left on Yonge Street, although I'm not quite sure if much sleeping goes on today in the upstairs bedrooms.

Why are we not building more mixed use developments today? I believe there are three basic reasons. Firstly, our social attitudes have changed. Secondly, our legislation does not encourage development of either mixed-use or shared-use developments. And thirdly, our financial institutions are hesitant to provide funding.

The North American ideal for housing is a single-family home on a single lot in the suburbs. The great majority of people wish to be masters in their own home to control their own immediate environment and destiny.

This admirable desire for individuality has spread throughout our community systems. Our institutions are segregated into separate individual identities — both at the government and commercial levels.

Legislation has established bodies, each trying to maintain their own identity and create their own castles. For example, we have established municipalities with their own non-profit housing corporations, and as well separate housing authorities. We've got school boards, both separate and public; library boards and hospital boards. Each wish to preserve their own identity and image.

A good example of this legislative segregation occurs in the provision and the process of providing houses for people as they get progressively older and less mobile. We have created a maze of different provincial ministries and municipal regulatory bodies. The Ministry of Municipal Affairs and Housing looks after senior citizens' apartments, and as people become less mobile, they're moved into rest homes licenced by municipalities. And when they require some nursing care, they're moved to the Ministry of Health's controlled nursing homes.

Each of these separate jurisdictions seems to wish to create their own buildings, to administer, maintain and control them. It's very difficult to create a mixed-use building. Anyone trying must possess physical stamina, persuasive powers to convince many different people of the social and financial benefits of integration. It's perhaps understandable that most mixed-use developments built in the last few years are large in scope and size. They're put together by large organizations with experienced personnel, having large financial resources able to withstand expensive delays.

I'll give just a couple of simple negative examples from my own experience. In the '70s, a school board in the Ottawa area asked me to design a library addition to a school. At the same time, the library board asked me to design a library just across the street. I tried to convince both clients to construct a joint school-community use library. But this sensible idea was turned down. The excuse given was that the Catholic people would not want to go into a library in a public school.

The real reason was that each party wished to maintain its own separate identity, and they could not agree to co-operate.

More recently, I acted as a development consultant for a downtown revitalization program in Perth. It seemed reasonable to follow the 19th century development on the main street with apartments over the stores. But it was not economically viable for the developer — and this was a small project — to construct affordable housing without some federal or provincial subsidy, and those programs terminated last year.

Due to the administrative and legal problems in dealing with so many different levels of government to create just 20 units of residential accomodation, the idea was abandoned.

If there had been a strong social desire to create these units, we could have gone ahead, but people did not really want to live above stores when vacant land was available close by for single-family housing units.

The second reason I give for not building more multi-use developments is that there is no encouraging legislation. Planning and zoning bylaws reflect our social attitudes and ambitions, but we've created mono-use zoning. A developer wishing to create a new multi-use building, or renovate or convert an existing one, is faced with asking for a zoning change.

The present procedure involves community groups in the planning process who cause delays. Developers, in my experience, prefer to stay away from projects which cause administrative hassles.

A good example is an application to convert an existing large, single-family home, and there are large single family homes that are just too big for people today. You want to try to convert that into apartments, or into a group home, or a day-care centre — that idea is not acceptable in the majority of our residential single family neighbourhoods.

The third reason I suggest is that our financial institutions, and I mean all lending bodies including Canada Mortgage and Housing Corporation, banks, mortgage companies and private investors, do not welcome mixed-use developments.

An investor examines risk and security in the event of foreclosure. On a scale of desirability of investment, number one is an office building standing on its own land, with long term leases. Number two is apartments with one year leases. Third is hotels with good, experienced management, even though they only have a 1 night lease.

A hotel is not a bad investment if you could rent the rooms by the hour. But, the least desirable is mixed use, where land may be in joint ownership involving different government subsidies and programs, and often more than one lending institution.

Economic failure of one part can cause a ripple effect and place the whole development in jeopardy. This added risk can be compensated by higher interest rates, but many investors prefer other more secure opportunities.

Tied into financing, of course, is market analysis to determine if the project will rent. And some are doubtful if apartments over store would rent.

I wish now to make some suggestions of changes that must be made so that, by the year 2000, we will have created a social, economic and legal climate to create more mixed and shared use developments.

Social attitudes may take a long time to change, but remember that five years ago, Detroit was still concerned that people wanted large gas-guzzling cars. They laughed at the small European and Japanese manufacturers. But increasing energy prices has changed all that. And people's attitudes have changed. They want the small cars.

We in the housing field must play our cards, to convince the public that they can no longer afford the green home, nor can government and the taxpayers afford to provide subsidies for energy inefficient suburban subdivisions. The public must be convinced that we can no longer build such facilities, we can no longer afford to have a building just with a brass black of a board of trustees of some board, when alternative accomodation can be shared in another building. We must revive our legislation and our subsidy programs to encourage mixed-use development to make it advantageous to integrate and not to segregate. We must find ways to rapidly change our zoning bylaws. As planners, we must remember, Patrick Abercrombie who said that good planning is only possible in an enlightened autocracy. Politicians must play their role, as defined by Edmond Burke, of convincing the public and the community associations of the wisdom of planning policy. New mixed use developments must be constructed and older buildings must be renovated for mixed and shared uses. It is possible. It can be done.

Joe Berridge:

A principal in the firm of Coombes, Kirkland, Berridge, he offers a wide range of design, policy and development advice to developers and governments undertaking major urban projects. Formerly, Mr. Berridge was responsible for several major planning processes in Toronto including preparation of the Official Plan for the new St. Lawrence Neighborhood and the Central Area Plan sections on housing policy.

It's not really any accident that the major projects that we see around us have been undertaken in some form or another by governments or government agencies, because they're the people who have the ability to absorb the slings and arrows of outrageous regulation requirement and so on, and financing that are necessary to get a project under way.

What I'd like to do is to talk about three major inner-city, mixed-use developments. There are a number of examples one could select, but I think what these illustrate are some basic principles on how, if one is undertaking a mixed-use development, how best to go about it, and what the kind of themes are that one should utilize.

For a number of reasons, a lot of big cities in North America are undertaking very substantial developments. Toronto, Vancouver and the cities of the eastern seaboard are finding themselves in situations where they have major public land holdings that they want to turn into development for obvious reasons to realize the hidden asset of those resources, and generally, to use that publicly-stimulated development as a means of improving the economic health of their downtown cores.

Cities and their public development agencies seem to have recovered some of the confidence that they perhaps lost after the great round of major urban renewal projects towards the end of the '60s. That period of development kind of petered out as a result of public opposition and lack of funds, and in a sense ended one whole decade, one whole generation of redevelopment.

I think what you're seeing now is a new generation, and I think a much better generation of development happening. The reasons for this new development form have to do as much with lifestyle changes as they do with the more quantifiable concerns of energy costs, taxation burdens and job creation, although those things are clearly important as well.

The three projects I want to talk about and show some slides of, are ones that our firm, Coombs, Kirkland, Berridge, has been involved in in various different capacities. The first is the Battery Park project in New York City. The second is the harbourfront development which is just down the road here to the west of the Harbour Castle complex. And the third is the St. Lawrence neighbourhood which is just to the north of us here, on the other side of the Gardiner Expressway.

What's interesting about these projects is that they all have common design and development characteristics. And those common characteristics are in fact part of the reasons for their success. They're all publicly sponsored projects, in varying degrees. They've all managed to get into an active development phase in a remarkably short period of time.

They're all projects which, in their design and development philosophy, are what one might call the latest generation of projects.

What I mean by the latest generation of projects is essentially projects which are based on the kind of thinking best encapsulated by someone like Jane Jacobs in "The Life and Death of American Cities," the utilization of traditional building forms and relationships — the elements that characterize the parts of the cities that we love best in North America, and that are so familiar to those who visited European cities.

It's very interesting, in fact, that these ideas, which are really the traditional lexicon of urban development have taken so long to re-express themselves in contemporary form.

The Battery Park City project in New York City was sponsored by New York State. We are connected with this because Olympia and York have been awarded the tender for the development of the central part of the site, right in front of the World Trade Centre. The entire site is about 90 acres.

What's very interesting about this project is it illustrates classically the change in development philosophy. This area was landfilled in the late '60s, early '70s, and essentially what was proposed for the site was a very traditional urban renewal style mega project.

For a number of reasons, some of which are connected to the failure of New York City's financial situation, the project never got off the ground. But I think the real reason it never got off the ground is that it was literally unbuildable.

I want to turn to Harbourfront now. Harbourfront is immediately to the west of the Harbour Castle Hotel complex.

Our firm is the principal consultants, and we prepared the site plan of this 90 acre — very similar in size to Battery Park City — redevelopment of what was originally industrial land.

What Harbourfront has done is sort of similar to Battery Park City. It's almost uncanny that the two developments were working at the same time. They, too, had a bunch of earlier plans which lacked the kind of serious development strategy to really get them into development.

What they needed was a site plan which identified the development parcels, and allowed private development to carry the financial burden while Harbourfront carried the over-all co-ordinating development burden.

One of things that really goes wrong with development proposal calls is that people inaccurately define the chunk of land they're putting out to private tender.

Part of the reason that a proposal call flops is because there are too many things that are not adequately defined, too many elements of the design which are idiosyncratic. The connections between parcels are insufficiently established.

There's quite an art to doing this and Harbourfront is probably further ahead than anybody in the country, perhaps even in the world, at doing this successfully.

The last example I want to use is the St. Lawrence project which in many ways, for anybody who's worked in Toronto, is kind of the grandaddy of all projects.

St. Lawrence is a City of Toronto-sponsored project. Most people think of it as a lower-income housing project. In fact, it's a very mixed-income housing project with a substantial amount of private development.

The extension of the existing street grid and the establishment of a formal park — the Esplanade Park — that links the entire development and is itself defined by the buildings on either side of it provide those kind of Jane Jacobs ideas of neighbourhood quality, neighbourhood feel, the traditional relationship between streets, the front of the house, the house, the back yard, the back lane, parking. What's interesting about St. Lawrence is that it was really the first development to experiment with the development proposal call technique for private developers in the City of Toronto and it's fascinating to walk around now and see those things which were controlled and weren't controlled in terms of design and material and colour and height and so on. And it's like a whole learning exercise of really how to put a major project, parcel it up, and put it out to tender.

The message that I'm trying to put across is that large-scale, mixed-use development is very complicated. However the problems of it are not insurmountable. What they do require, which is very different from the traditional kind of architectural process, or development process, is an awful lot of thought early on about how you're actually going to build this thing, as opposed to what's going to get built.

Too many site plans represent the particular philosophy or thought of their designers, which is certainly not a quality that one wants to trammel out. But it's something that has to be arbitrated against the very practical concerns of how you actually undertake development.

What's interesting is that the traditional ways of doing it, the traditional urban forms that we all know and love, seem in fact to be the best and the most practical.

QUESTION: Will the adventure in New York also include differences in tenure — rental, ownership and perhaps co-op — and will these also blend in the different income groups that are available with the St. Lawrence project as it presently exists.

MR. BERRIDGE: That's a good question. They're not quite sure, to be honest, in Battery Park City. We're not directly involved in the residential part, but I know what's going on. They have the same problem in the U.S. as we do here. They have no programs, so they can't put out a mixed income project with no programs to fund it.

Yes, you can have any design requirements that you like, and any program or income requirements that you like that will have market acceptance.

One of the most remarkable things we've found is that developers — certainly in the city — almost seem to appreciate the rigour of, say, the Harbourfront design guidelines and financial requirements, that they know exactly what they're getting into.

If one of one's objectives are the provision of mixed-income housing, then certainly one can define that in a way that can get market acceptance.

The problem is that there is no program that can really produce that kind of housing other than the co-op program, and that interest rates are making most forms of housing impossible, certainly low-income housing.

Jack Friedman:

Mr. Friedman is a lawyer (Q.C.) and a developer. He has represented clients who were developers and builders and has acted as a developer for various major projects including Village Square in Burlington, Ontario and the Waterloo Concourse in Waterloo, Ontario.

I can best begin by telling you my experience with two projects. The first is the Village by the Grange in Toronto, which answers the criteria of most mixed-development or mixed-use developments, and that is it was a development of some 600,000 square feet adjacent to the Art Gallery and the Art College.

The second is Village Square, which is retail and office only, and, when completed, will be approximately 75,000 square feet and to which conceiveably some residential may be added. This is located in the downtown Burlington.

Village by the Grange in Toronto is located on a four-acre site lying between McCaul and St. Patrick Streets, just off the core part of the city, is immediately adjacent to the Art Gallery, to subway stations, and to the business area.

It contains some 630 apartments and townhouses, about 40,000 square feet of office space, and about 100,000 square feet of retail space. It's really one building built on an underground garage, with commercial on the main floor, a podium above that, from which rises what looks to be seven individual buildings. Actually they are inter-connected with a glass walkways and range in size from five to 11 stories. , The entire podium is landscaped, and one of the buildings is devoted half to office space, and the other half to residential, but does have two separate lobbies.

The commercial component originally had open, covered walkways, but we found that what works in California just does not work in Toronto. We subsequently have covered in, enclosed the walkways and covered in the open courtyards in the center of the project.

In the design of the apartments and the townhouses, we had a range that went from a junior one-bedroom to units that were as large as a five-bedroom townhouse. The mix was an emphasis on the junior ones and the one bedrooms — approximately 80 percent of the units were directed toward that market and beamed at the single people working downtown, and working couples.

We found in our leasing program that the smaller units, that is the junior one bedrooms, or the one-bedrooms and so on, were the first to lease. The larger units and the townhouses were the ones which — I won't say we had resistance — but they were the last to come on the marketplace and to be absorbed, primarily because the unit of requirement downtown was for the small, rather than the family requirement.

The office space, although starting somewhat slowly, picked up pace very quickly, and was all leased at a very early time once the concept in Toronto was established that one could cross University Avenue without being entirely banished to the midwest.

There has been a considerable amount of development westward of University Avenue, which took some time to really cross that great dividing line. All I can say is I wish we had another 100,000 square feet of office space to lease, considering the trend that has taken place with office space in the downtown core.

The greatest input, the greatest concentration, was really required for the retailing component. And again there was the problem of the crossing of University Avenue, although that has been accomplished and those of you who have taken the time to walk along Queen Street between University and Spadina have found that that has become a very unique and inviting shopping area.

But it's on our present location, adjacent to the downtown area, but not part of it. We weren't uptown, we weren't downtown. We're really in a pocket and even in that respect, rather insulated. To the north, we have primarily institutional uses of land such as government buildings, hospitals, St. Patrick's Church.

To the west we have the Art Gallery, the Art College, Grange Park, again, isolated and divided from the residential component of the transplanted Chinese community.

To the east we have University Avenue. And, to the south, only now beginning to come into its own, a rather mixed bag of old buildings which were loft manufacturing buildings, but have, of recent days, come into their own, and are now being refurbished, and some very interesting things have been done.

One of the forerunners was the Diamond Admirer's effort on King Street West, just west of Honest Ed's project, and a very interesting project that was.

But our project of Village by the Grange never was, nor it is likely to ever become — because of this isolation and insulation — a part of the Chinese community.

So we thought we'd try and learn by the successes of others — and lack of success. We visited, I suppose, just about every major shopping development of this unique type, as well as some downtown mixed-use developments.

We went looking because we realized that we had a peculiar and special problem in the commercial or retailing component of Village by the Grange. And what we found was that all of these established one rule and that there was really not any rule at all, with one exception. Each had a different input, a different set of facts and factors, varied in concept.

The one thing that seemed to be consistent was that each had developed a concept around which the development was built. Some relied on unusual structures, some relied on the historical background of the area, others relied on the brilliant re-use of existing structures, and at Village by the Grange we had no historic background to the site, except that part of it was once occupied by the family of John Wayne — Johnny of Wayne and Schuster, not the Duke.

There were no existing structures that were of any great interest. There was no tradition upon which we could build a thing.

We came to the conclusion that what we had to do there was to build for the commercial and/or retail component, a people place. And as a result we brought in artifacts, old storefronts which we acquired in antique sales and auctions — storefronts from 18th century England that had been disassembled and brought over and were sold here. And we would cater to the downtown office workers and, because of our proximity to the hotels and the tourist trade, the Art Gallery and the Art College and the universities, the traffic that those generated.

We also realized people like to eat and they like to be entertained. And so we had as anchors which consisted of a farmer's market at the north end of Village by the Grange, which contained some 20 odd fast-food and food-for-home-consumption outlets.

At the south end was the Grange Gallery where we had developed a collection of fine Canadian hand-crafted items which are really unusual and we took a great deal of pride in being able to display those.

Along the spine between these two so-called anchors, we had mixed uses, such as restaurants, shops dedicated to fashion, crafts, galleries, and the main factor and totally out of proportion to what is usually expected in a commercial concept — about 40 percent of a retailing area devoted to food-oriented operations.

We tried to avoid any type of chain store operation. We looked for the uniqueness, the boutique concept and so on.

But all I can say at this point is that the assembly of land, the rezoning process, the building of the project, took, I regret to say, almost 15 years — a luxury that present economic conditions would not permit.

If I may digress for the moment, it would seem that, if comprehensive, downtown mixed use developments are to proceed with any degree of expediency, there must be an ingredient of governmental intervention in the assistance, the acquisition and the completion of the assembly of the site.

Because, as sure as night follows the day, in any large development such as Village by the Grange, where there were close to four acres, there are bound to be some who feel that there must be a direct underground pipeline from the Alberta fields directly under their particular site.

Dealing with Village Square in Burlington, we had a totally different concept, a totally different approach. It's different in size, it's different in its marketing thrust. When it is completed, there will be some 60,000 square feet of retailing space and about 15,000 for offices to which we may add a residential component.

Burlington is a city of some 115,000 people. It's in the golden horseshoe lying between Toronto and Hamilton, and our development there was built on 1-1/2 acres — again an assembly, but, fortunately because of its smaller size, and perhaps because the concept of doing something in a smaller city in a downtown area, had not yet achieved the thrust that hopefully it may in the future, and the problem of doing the assembly was not that which we had faced in Toronto.

We have retained in that project three of the original houses on the site, all of them over a century old. They are now all functioning virtually in their original condition, but obviously refurbished.

We used the infill of the rear yards of these houses, which were originally obviously residential, but by the expansion of the commercial zoning from the main north-south street in Burlington, were included in commercial zoning, and therefore could be developed without the necessity of going through a rezoning application.

There were certain basic rules that we attempted to follow in Burlington. Firstly, there should be a primary market of at least 50,000 people, and that we had. There should be a secondary market, which is say, within 15 or maximum 20 minutes drive, of at least a quarter of a million, and that certainly existed there. The concept should be directed at an upper-income bracket and that was there.

And it should be a location that is readily accessible by arterial roads and public transportation, although the public transportation is not really that vital because the market to which one directs this type of development is primarily the middle- or upper-income, and usually they arrive by automobile, and of course that raises the question that there must be adequate and sufficient parking regardless of what municipal requirements are.

In some cases, to make sure, the developer may, strange as this may sound to some planning authorities present, set himself a goal of having a higher parking requirement than even the municipality may require because, in the end, if the people cannot part conveniently and easily, they just won't come.

Now, dealing with each of these aspects, we also did the interiors and the whole approach of having each of these shops look as though it was built at a different time for a different owner — in effect trying to create a street scene as it may have existed at the end of the 19th century.

In the last phase, which we've just completed, one of the buildings is a reproduction of a 19th century courthouse. Another is a reproduction of one of the original hotels in Burlington.

Again, we tried to do a concept that was integrated well into what had taken place in the immediate surrounding area because, fortunately, in the Burlington scene, there had been the beginning of a commercial development in the streets that were just off the main street.

The result was that you had a sort of junior Yorkville area developing in Burlington, and we feel that our Village Square acted as a catalyst to advance and promote that development and indeed, a mixed development in the downtown area.

But every location has its own special set of factors to consider, and different rules to apply. And really, basically a mixed-use development as we saw it was a recognition of the fact that man is essentially a social animal and requires the interplay of social activities. And if one can create or develop or build upon an environment that allows him to eat and to sleep, to work and play all in a close proximity, under one roof, you satisfy a very basic social need, and therefore there should be the success for this type of development, and the demand for it.

We felt as a developer and as a builder, the result was a main street restored and a town square revitalized. We have found projects such as Village Square and Village by the Grange fun to do, and in every aspect a rewarding experience.

QUESTIONS & ANSWERS

QUESTION: Both projects you developed do not have any anchors. Did you have any difficulties in financing them — government financing — because most financial institutions look for some anchors in their major projects of that nature?

MR. FRIEDMAN: With regard to Village by the Grange, because of its scope and the complexity of the actual construction, we did bring into the project a firm which is an experienced builder, a large developer in its own right, and as a result were able jointly with them to obtain the financing that was necessary at the time, although there was a delayed period, even with the strength of this joint venture.

We actually had a delay of some year or year and a half because the market just was not available for raising the kind of money that was needed in a project of this size. In Village Square in Burlington, a much smaller project, fortunately we were able to arrange bridge financing to start the project.

As I look back, I guess I probably had more courage than brains at the time, but it worked out because the lending institutions initially were rather hesitant about the concept of downtown development.

Who are your anchor tenants? Who are your triple A tenants? When we attempted to explain to them that a major food store in the middle of some concept like this would totally destroy the feeling we were trying to create, that getting a number of chain operations into the project would remove the personalized service that has made Village Square the success it has been. There's no reason for anyone to come downtown to a project like that if it's going to have the same type of chain stores that you have in a dozen different shopping centres throughout any city.

That created a financing problem to begin with, but, finally, we did find a lending institution that saw the light of day and when all the smoke had cleared.

QUESTION: Given the concensus of the panel of the necessity for public involvement to undertake these projects, and along with that, public knowledge of what's planned, or what is being contemplated, and given the result of price escalation associated with acquiring the land you need, can you give those same public bodies some hints on how we might, or they might, get involved in the beginning and keep those prices down, get things done, give them the public knowledge that there's big plans for your property, but keep your price down please? Any hints at all on how you can go about your acquisition strategy to get by that first big hurdle of getting the property?

MR. FRIEDMAN: Well, as I say in both Village by the Grange and Village Square, we had a longer road to travel in Village by the Grange because of its very size, but nonetheless were able to assemble close to 60 properties over the period of time, and put it together, and it was difficult.

But the problems that exist today didn't exist then. In Village Square, it was a smaller thing.

Some municipalities have perhaps had greater foresight than others, and do own lands themselves in the downtown core. Therefore, it's not a problem of acquisition or, at best, perhaps an infilling situation.

I think it would sort of go against public policy to have a developer come into a municipality and say, "I've got all but three pieces of property for what I want to do. Would you go out and expropriate it for me?" That would not go well politically. I don't think it in all likelihood would stand up legally because you'd have a difficult task proving it's for the public good or welfare. It would seem to me the way a municipality could move is to decide, through its planning staff, where they want to move, and acquire the lands, and then invite proposals.

You gave us a description of the Village project in Burlington, and I understand you haven't built the residential units just yet. We're all aware that the only housing game that's available just now is municipal non-profit housing, and unless the federal budget brings in other programs, that's all we're left with. Can you give us some reasons why the housing component of the Village Square project in Burlington hasn't gone ahead?

MR. FRIEDMAN: Well, the site itself was rather small and even as small as it was, we built it in stages because we had some delay in acquiring the original site. The total site, when complete, will only be an acre and a half. Fortunately, it's located between several municipal parking lots, and with the zoning and the planning that has been done by Burlington — they were farsighted enough to create public parking in the downtown area, so we didn't have to acquire lands to provide that parking.

But the easiest and fastest way we felt of getting this project on the road was to build where that part of the mixed use development would have the greatest demand. And that was in the retail, and to a more limited extent, in the commercial areas.

Now that we have established a track record, and a focal point, it would make sense to us at this point to examine in the final stage a fire hall which has about 10,000 square feet of land. But, hopefully, we can design something that would contain some residential component in that, and complete the true concept of mixed-use development.

QUESTION: I'm concerned with resistance to residential development, first of all when mixed with commercial development, but also residential development in downtown areas in smaller communities.

MR. BERRIDGE: The principal problem is a marketing one. I think what's interesting is that that market is, in a sense, spreading out. And I think that, whereas the dominant market for housing still appears to be the single-family suburban house, some markets are appearing of sufficient size that people can capture those in small towns.

Particularly, one should be looking at retirement or semi-retirement, empty-nestor type of homes, and in some of the more attractive smaller towns in Ontario, that is a real market and it's going to be a very growing market.

But clearly, the resistance at present is because the type of people who want that accommodation in downtown Toronto don't live in Orillia or Lindsay or those size towns.

MR. FRIEDMAN: Well, again I'll come back to Burlington. Our location is only a couple of hundred yards north of the lake. And there are a number of large apartment developments in the immediate area so that residential use in the downtown area is not a rarity in Burlington, because it's all within walking distance.

What we would have added or may add is something different in feel rather than a high rise because on our site our total density is about 1.2 or 1.25. Permitted density is far in excess of that, but we were building to the marketplace rather than to permit a density.

It would really depend on the municipality and the ambience of the area as to whether the people and the marketplace will come and live in the area. Obviously, in Burlington, they did. I dare say in a number of other small cities they will do that as well. In some cases it may not be so.

25 Industrial Area Renewal

Tom Loebel:

President of Leaside Industrial Park Association. East York, in which the community of Leaside is located, has been more successful than many other cities in its interreactions with industrial organizations such as the LIPA. LIPA is a strong force in area planning.

Industry is under attack. We feel threatened. We're besieged with higher taxes, endless government regulations and constantly changing conceptions of our role in society.

The re-activation of the Leaside Industrial Park Association is our response to one part of this attack, namely, incompatible redevelopment. Our association considers open-air tennis courts next to Canada's largest aluminum smelter to be incompatible. We consider a large commercial office-building that would flood the area with traffic, when the area is already flooded with tractor-trailers, on old roads, incompatible. These are but two of the uses that have been suggested by individuals for our heavy-industrial area.

In an older industrial area, such as ours, changes must come. All our members appreciate this and accept it. But the changes must encourage industrial growth, not hamper it. Accordingly, our association's raison d'etre is, to work with the Borough and its residents to effect positive change.

I'd like to give you a very brief history of the re-activation of the association. A number of years ago the borough expressed concern about the long-term viability of the area as an industrial area. And, at that time, the mayor called a meeting (at one of the Leaside buildings) of all involved industrialists. The turnout was extremely large. The interest in the area shown by the industrialists was very, very high, prompting the mayor to form an industrial sub-committee, to act as a liaison group between the borough and industry.

This continued for a couple of years, and while it was going on, members of the sub-committee — the industrialists — realized that we should have an association of our own. From this feeling, came the Leaside Industrial Park Association. And what the four or five members of the sub-committee did was, to go around to different industries and ask if they would be interested in joining, and stating what the problems were.

The problems were, our buildings were old, and people considered the area an industrial slum. In actual fact, a very, very high percentage of the industry was spending a lot of money on the various businesses. But you have to spend your money to generate profits to remain viable.

And one of the last things you concern yourself with is, the exterior of your building because, although it is a necessary expense, it's non-productive in terms of industrial output.

In our membership drive, we did not approach or concentrate on tenants or on industries that were reluctant to join. But we ended up with 75 of the assessment — business and reality — represented in our association. We were fortunate to have some large well known companies, such as Corning Glass, Bristol-Myers, Domtar, and a mix of non-household names, and many others. We ended up with approximately 25 members and decided that our initial function was to act as a liaison group with the borough.

Our initial projects included preliminary clean-ups. We went around to all of our members and pressured them to cleanup obvious messes — cut down weeds, clean up unsightly spots. We ran into one problem where an industrialist (or an individual) wanted to put up tennis courts, and the real estate agent he hired went around and took pictures of the ugliest sights he could find. We recognized that, by being sloppy, and not taking care of our properties, we were leaving ourselves open to this type of attack. We were reasonably successful with our members but not as successful with our non-members.

We also had to wage a long battle with the railroads to get them to clean up around their tracks. They stalled for umpteen months, before they would even tell us what track was their responsibility, or what track was our responsibility. Some of these tracks had been put in years ago and nobody knew who they belonged to.

We also decided that the association should not be a social organization but should be directed at industrial revitalization. Our meetings are organized and extremely productive. Our average turnout for general meetings is over 80.

We have a very important role to play, and we need a strong organization. Because the borough is interested in us, they have spent time — and money. We must defend ourselves and make sure that there are no misconceptions: an industrial slum may not be an industrial slum.

We provide information for the borough when they ask and liaise with property owners. The industrial representative from the property owners association attends most of our meetings, and we try to see that our wishes, theirs, and the borough's blend together.

The other advantage we have is, our first few presidents kept our association very much on course. This is important because we need the active participation of our members and, if we waste their time and money, we lose them.

Finances became an interesting problem because, when Phillips moved, a developer came in with all kinds of ideas which were clearly incompatible with industrial development. This necessitated our hiring a law firm and a municipal planner. Now, we've spent so far, in the last four years, approximately $25,000 on legal fees and planning costs. To raise this money, we really had to stretch and think of ways to keep our smaller firms, because we need their participation. Also, we did not want to be in a position where people could say that our association consisted of two or three big companies.

We've always charged nominal dues — some years it's $50; some years, $100. To finance the big programs we have, we assess our membership on the basis of the taxes they pay — a combination of business and realty tax. And we felt we should have $20,000 in reserve. It worked out that, if we charged each of our members $1,000 per million dollars of total assessment, we could raise the money. The general membership was very pleased because it was a reasonable amount of money for the size of the businesses concerned. And we've had no difficulty collecting the money. We also decided, since every company needs as much money as possible that we would only draw on this assessment when we needed it.

Our association, by and large, has been unanimous in all of its decisions, although it's not always easy to get 25 companies to agree. But we have a direction that we're moving in and we've been supported by the borough. We are also well-supported by the property owners, so we feel that we will accomplish our aim to revitalize the area each of us feels is so important to our own businesses.

Peter Barnard:

President of Peter Barnard Associates, Mr. Barnard was the director of the East York study to show that borough of Metro Toronto's efforts to retain the viability and integrity of its major industrial area.

The area — roughly around a 370-acre area — is home for a large number of different industries. Many are household names in Canadian industry. Our terms of reference started with a variety of concerns about this area, complicated by conflicting positions. The first one, the major concern of the borough was, that this area was a form of urban blight and a drain on the economy of both the borough and Metro. Other concerns were related to conflict in the future of this area: There were new industries coming in and, with natural reluctance, existing industries saw some threat to themselves. There was also a typical traffic problem in the older industrial areas.

What we have is an area which is in a state of flux. It's an older industrial area. Industries will evaluate decisions to stay or to move, whether to rationalize production processes, and in this case, many companies left the area. Many companies who are still there, have expanded or diversified their operations by locating plants in other areas. In most cases, these industries needed more land and felt it would be more appropriate to be in a more green-belt location, as opposed to Leaside.

On the other hand, many firms are committed to this area; they have put in substantial new investment; and they have been extremely supportive. And a number of new organizations (developers or other organizations - interested primarily in property management) have taken the buildings over, renovated them and converted them into rental properties. But the general problem has been the resistance to pressures for non-industrial use within the area. The future of the area is also uncertain, and this is essentially where we come in to try to firm up the borough's position and to help bring about changes that would be desirable for everybody, in the long term.

To provide some prospective, we did a detailed comparison of the advantages, disadvantages, and a profile of various industrial types between the Leaside-Thorncliffe Park industrial area, and a large number of both older newer and smaller industrial districts. This was a fairly comprehensive examination. It included a lot of information collection, and a detailed profile of each of these industrial areas was developed. Accordingly, we drew some conclusions. Compared to the new industrial areas the principal conclusion was, that Leaside-Thorncliffe area has a different industrial profile: We get a different size and type of industry. We get a much heavier predominance of what's called heavy industries. But of course the other point is, many firms located in this area have been there for decades. Compared with the newer areas where people have more recently invested, we have a much 'older' profile.

From a planning point of view, it was quite different physical design — while it was the earliest Canadian industrial park, it has, by current standards, obsolete road patterns. It does not have an ideal configuration of different sizes and characters of lots — it has many buildings which occupy the same number of square feet. Many have no setbacks from the lot line. And, although the buildings are predominantly single-storey, the bay sizes and ceiling heights are not ideal for most modern manufacturing and storage operations. The other significant element of this area is its proximity to a major, well-established residential district. This district has co-existed with the industrial area for decades. And, another major problem was inadequate planning in the past which has resulted in a zoning by-law which the borough is unable to defend, and is causing intrusions into the area.

There are unique characteristics in the Leaside-Thorncliffe area. First of all, it's a separate industrial area. Unlike many of the older city districts, it does not have major residential commercial areas in it. It is well defined. It has good rail service to most of the properties. And, it has the advantage, in this case, of having mainly single-storey industrial buildings which are easy to renovate.

Summing all those up, one has to say that the Leaside-Thorncliffe area has some very positive aspects from a market attraction point of view. One advantage is, it's an excellent source of labour, with excellent transit and car access. This makes it an excellent location for labour-intensive industries. It has another advantage of being close to the downtown core. Accordingly, we find many firms here which provide services to the downtown office buildings. The area has certain disadvantages. It is not as good a location for companies wishing to serve broader markets in Metro. There are better locations for that kind of situation. The major problem is, limited land. If you want to move into this area, you've got to take an existing building and make the most of it. Or, if you wish to develop new property, you're usually faced with demolition first. And, finally, the traffic situation is a major deterrent to many companies, particularly those with substantial transportation needs.

In the usual fashion, we set up objectives and started to talk strategy: how to overcome some of the problems and take advantage of the opportunities. Our report stressed the many strengths like the strong commitment to the area. It's not a question of huge vacancies or plummeting land values: Land values are as high as any in Metro and space is taken up at an acceptable rate, in terms of market demand. We have land available and, as I've already said, there's good access and a labour supply. However, the problems here are real, and our strategy is geared to solving them.

First, there's been a considerable decline in the area's contribution to the borough's assessment base. It's fully documented in our reports. But, basically, the combination of older buildings, various assessment appeals at which companies have been very successful and basic provincial assessment practices, has penalized the area considerably. We feel that the basic thrust of the borough's revitalization scheme should be to increase its contribution to the economy, while not undermining the strength of the area. Our principal purpose then, is to preserve the existing industrial base and to encourage compatible new development with the objective of increasing both jobs and assessment.

Finally, our conclusions and recommendations: The principal conclusion is that, if the industrial base of the Leaside-Thorncliffe area is to be maintained, it's going to require active support and encourgagement. The growth of companies in the area depends on their ability to acquire new land. And it's a very complex process — in many cases, we found that, because of the uncertainties in the area, non-industrial users were able to outbid industrial concerns for land, cutting off possibilities of expansion. We concluded that we need to have definite policies and controls, to keep non-manufacturing users out of the area's inner core.

We found, too, that existing municipal codes and building requirements are inadequate. We've studied the expansion plans of various industries and what we find is that most of them are interested in expanding and acquiring land in the inner-Leaside areas away from the perimeter. The perimeter is undesirable, because of transportation problems and non-industrial users on the other side of the street. And, if we don't provide some alternatives, we're going to have lands which are underutilized, in the area. The major departure in our recommendations is that we should start to consider non-industrial uses around the perimeter of the site. Accordingly, we have made specific recommendations for changes in land use. The impact of non-industrial uses on those districts can be minimized (or avoided) through proper planning and strict zoning requirements.

The other point we have made very strongly is, it's now time for the borough to play a very active role in preserving and revitalizing the Leaside-Thorncliffe area, both to retain industry and to facilitate desirable changes in the industries. We advocate a more active, rather than reactive role for the borough. Because it's so dependant, financially, on these industries, we feel the borough should be making an effort to retain industries, and to encourage their expansion on borough lands.

The Eglinton district is being recommended for light industry (and some limited commercial). The inner-core is the one that's being consolidated as an industrial core. Laird is being restricted to lighter industry. Carruthers is still under discussion, but at present time is looking at lighter industry. And the major recommendation is for Overlea Boulevard — this district is to be converted into the borough's major office location. We are instituting a number of zoning and by-law changes in that area, to permit some reasonably significant office development.

The other point I'd like to go through is, the kind of administrative support we have recommended that the borough use as backup in its planning. We have suggested that they hire an economic development officer whose major objective would be, to encourage assessment growth and employment growth in the borough. His/her job, would deal with all industrial and commercial activity in the borough and part of the job would be to liaise with existing industries and be familiar with the nature of the industry and the nature of forces affecting their future.

Liaison with other levels of government, particularly provincial and federal, on the many facets of current economic and industrial development, is essential and will help industries to remain in the East York area. I would emphasize that this position we've recommended is one for the borough as a whole, not just for the Leaside-Thorncliffe area.

We have also suggested a business liaison committee and the idea would be to facilitate information flow and to improve the viability of industry within the area, through whatever actions are open to the borough. The committee should be appointed by council, but we've recommended representation on the committee from the Leaside-Thorncliffe area, other commercial and industrial areas in the borough, the Metro Labour Council and members from the East York Council. One of the most important elements of this committee and the economic development office will be, to get on top of key trends in the borough and to report regularly (to the borough) on what's happening.

This is by no means a simple exercise, and we have developed an information-base in our study. The information and monitoring system we've recommended should keep track of the major points which relate to the objectives we've recommended — assessment and employment changes, for example. These two elements are not easy to monitor, but they're important to the borough, in the long term, as are expansions of companies, where they moved and, the reasons for any moves.

This represents the essence of our recommendations. Our report, as I've said, is going to be tabled in the near future

26 After Downtown And Main Street Revitalization

William Bowes:
"Bill" Bowes is President of the Grande Prairie Central Business Association in Grande Prairie, Alberta. He has been a newspaper publisher in that city and owner of a cleaning firm. He holds many memberships and posts with local organizations and is a director of several Alberta companies.

I have been fortunate enough to have been involved, 'embroiled' might be a better word, in the downtown revitalization of our small northern Alberta city since 1974 when a few people began to be concerned about what was taking place.

The central business association (CBA) had small beginnings. Unlike the Chamber of Commerce and retail merchants, which were both active in the city, the CBA had a different set of concerns put forward by a group of about 20 proprieters, owners, developers and merchants of the day. It might be said that central business association was born of fear — a fear that the core of the city might cease to develop as regional, peripheral shopping centres began to appear on the scene.

The first letter that went out from that small band to all the landowners and renters in the central business district said in part: "The recent updating of the city's general plan underlined what many concerned Grand Prairie citizens have long felt. The downtown is threatened with serious deterioration and unless this trend is stopped, it will result in major losses to those of us who are located in this area and ultimately to every taxpayer in the city. A group of concerned citizens have volunteered to spearhead the formation of an organization consisting of property owners and businessmen in the central business district whose goal is to ensure that downtown Grand Prairie remains the vital heart of the city that it always has been." The City indicated enthusiastic support for this proposed organization.

In 1974, the CBA goals were identified to be the halting of further regional shopping centre development outside the core area and the improvement of parking, circulation, shopping and public facilities downtown as well as a call for a comprehensive plan for the future development of the 242 acre central business district.

It is interesting to note that the CBA executive just two weeks ago made recommendations to city council for guidelines for a multi-million dollar shopping centre downtown. Included were these recommendations: the proposal would provide a catalyst for a healthy downtown redevelopment movement that will continue for the foreseeable future; it will, in the way in which it is sited, share the yet to be developed parking areas with the rest of the downtown community; it will call for easy vehicular and pedestrian access to the Richmond Ave. retail area; it will be designed in such a way its main entrance will appear to be a continuation of the Richmond Ave. retail scene; it will ensure space is reserved for future hotels, retail, residential and office development and the proposal will recognize the need for provision of community facilities such as a library, art gallery, performing arts theatre, as fully integrated or closely linked and that consideration be given to the possibility of a linkage with a future indoor recreation and convention centre.

In the seven years between that first call to galvanize the core people into action and the current proposals for a major downtown development, scores of changes have been brought about. Hundreds of meetings have been held, thousands of dollars have been poured into promotions, studies, surveys and calls for proposals and millions of dollars have been invested by two levels of government and the private sector in dozens of projects in the central business district.

Initially, the fledgling CBA executive looked at several grandiose planning schemes for virtually re-building the main streets of the core including canopies, sky roofs, pedways, etc. It soon became apparent that this approach was totally unrealistic and unaffordable and the CBA settled down to seeking improvements and downtown cleanliness, merchandizing, traffic circulation and parking. One of their first projects was the installation of hanging flower pots from main street light standards. Later a group of young adults, hired by the CBA from the local sheltered workshop, donned white coveralls and, with brooms, shovels and dust pans, moved through the downtown in summer picking up paper, trash and dirt.

Early in 1976, the executive heard of the Devion Group of Charitable Foundations and its founder, the late Eric

Harvey of Calgary. This group had launched a Main Street Alberta program which provided matching grants for certain face-lift programs on main streets in towns and villages in Alberta. Further investigation revealed the trustees were prepared to fund a substantial program for a small Alberta city and, after several months of negotiations in close co-operation with the city, a gift of just over $500,000 was arranged. These funds were spent on underground wiring and decorative lighting, sidewalk preparation for trees and for trees, planters and benches, for pedestrian trails along Bear Creek, for construction of two mini-parks and for the construction of a major downtown park.

At the same time, the city and landowners paid for new red unistone sidewalks which have met with such success they are now mandatory in all new Central Business District (CBD) developments and for additional lighting and funded design and engineering studies. Merchant owners promised to spend up to $1.5 million on new and redecorated premises.

Undoubtedly, this beautification and modernization program sparked a number of downtown projects. Several new stores have been built and many others have been renovated. At least 10 new, privately owned, office structures have gone up downtown. The CBA estimates that the private sector has invested nearly $35 million in the past seven years in the CBD. In addition, the city has spent nearly $10 million in new underground services, street widening and paving. A new provincial government complex valued at more than $15 million is nearing completion.

One of the longstanding problems plaguing the CBD was the existence of the main railway line paralleling the main street and marshalling yards only two blocks away. The city and province entered into protracted discussions which have now resulted in the removal of the marshalling yards and all but one main line track. This has resulted in the freeing up of more than 17 acres of prime CBD land to which the city will have title.

After the major impetus provided by the Devion Group, the CBA mounted strenuous opposition to several proposed peripheral regional shopping centres. With one 340,000 ft. centre already in place, it was felt that additional centres would seal the fate of the core as a viable shopping alternative to the existing major mall. The Peace River Regional Planning Commission, the updated Grand Prairie general plan, successive city councils and city-employed technical department heads fully concurred with the CBA assessment and continued to block further peripheral development. It was clear with mounting pressure from outside developers a regional sized shopping centre probably should be included in downtown planning. The CBA executive continued to press city council for a comprehensive redevelopment plan and a subsequent call for proposal.

After months of discussion a central business district redevelopment committee was formed by council, composed of the Mayor, three aldermen, the city manager, heads of planning, engineering and building inspection departments together with three representatives from the CBA. Several months later, City Council on the recommendation of this Committee appointed William Graham, Consultants of Vancouver and Edmonton to prepare a comprehensive study. Several drafts have been reviewed and the final study, costing about $150,000, will be approved and will form the basis of an area redevelopment plan, to be formally adopted by Council by the end of this year.

Meanwhile, Hudson's Bay, one of the downtown, major retailers, has formed a development partnership with Cambridge Leaseholds Ltd., who are now in the process of finalizing a proposal for presentation to the City by January 1. It is expected that it will meet the guidelines outlined earlier and that a multi-million dollar shopping centre will go into the downtown and be in operation by late 1983. Because the city fathers have continued to recognize the importance of core development, they initiated a very major downtown land acquisition program last year. Funded by debentures, the city has acquired more than $3 million worth of prime real estate adjoining the already acquired railway right-of-way. Only three or four land parcels remain to be purchased before the land assembly is complete.

From this experience, let me summarize my views of ways to maintain viable downtown cores. Having recognized the problems, a group must be formed from property owners, renters and developers and attempts made to organize a good percentage of this group into a central business association. Our CBA has an executive of twelve with four committees, a paid secretary-treasurer and a current budget of $25,000 a year. This executive meets at least once a month and committees meet more often. About 25 of the potential membership pay annual dues.

Once established, the CBA must win the support of City Hall and particularly ensure that all department heads are brought early into planning and discussion sessions. Without their support, we are convinced that downtown planning can go nowhere. A valuable partner in downtown redevelopment will almost certainly be the regional or municipal planning commission. These commissions have the knowledge and expertise on staff and will be supportive.

A strong organization will be recognized to be a strong political force in the community as well. It is absolutely essential, therefore, that the elected officials of the community be on side in the matter of downtown revitalization. It would not be unrealistic to suggest that election candidates be supported openly by the CBA. Since the process is long and time-consuming it may be necessary to seek and elect candidates who will understand and support the views for downtown redevelopment. It is important enough to the vitality of any Canadian town or city that no one should apologize for any degree of lobbying and work to achieve the goals of downtown renewal.

Having organized a group to promote core redevelopment, it is essential to quickly define the objectives and set priorities for going after them. Any group can rally support for bringing about cosmetic changes downtown that will cost little and then move on to the bigger things.

I'd like to conclude by saying, to suggest that, for Grande Prairie, no problems remain to be solved would be foolish. But we feel certain that the major hurdles to downtown rebuilding have been cleared. The future has never looked brighter. It has been brought about by the dedication of a small group of interested businessmen, developers and landowners who, early on, recognized the beginnings of a serious problem and moved to head it off. It has been made possible by the remarkable foresight and incredible co-operation of a succession of Mayors, Aldermen and civic officials, who have spent thousands of hours working to resolve the recognized problems of a decaying central city. The CBD will continue to grow and prosper just as long as this splendid spirit of co-operation between civic government and the private sector exists.

The 70's were exciting growth years for the whole Grande Prairie area. We think that the 80's hold a promise of even greater things for downtown Grande Prairie.

Gerald Parisien:

Mayor of the Ontario City of Cornwall for eight years, Mr. Parisien also holds a variety of other civic posts in Cornwall. He was an independent merchant for 25 years in Cornwall and has been a news editor, a political analyst and a freelance writer for a number of publications and radio stations.

Cornwall is a city of 47,000 persons located on the St. Lawrence River in Eastern Ontario just barely 18 miles from the Quebec border. In the mid 70's, Cornwall's business economy was relatively stable with very little development. The only thing that happened to our downtown in that period of time was a couple of drastic fires which eliminated some of the buildings.

The city was serviced commercially by two long-established business sections, one the City Centre, along the main street, and Montreal Road, a commercial area that had development in the adjacent township prior to annexation in 1957. There were also two shopping centres well within the city boundaries but some mile or so from the main business area.

The planning principle that downtown should be the strong focal point of the municipality, was the goal of the City of Cornwall for a number of years. With the introduction of the downtown revitalization in the Province of Ontario in the mid 70's, the whole impetus of Council was focused on utilizing the program to help some of the problems that had developed over a period of time.

You will notice I emphasized that we visualize the program helping to solve some of the problems. I'm afraid others, and I'm afraid they included rather prominent citizens and merchants, who thought the program would be the salvation of all the downtown problems, found that this was not the case. Experience has proven that other components are necessary and vital to a healthy downtown.

I must outline now what the downtown revitalization program did for the City of Cornwall. Under Phase 1, we implemented a closed-traffic pedestrian mall for two complete city blocks of our main street. This was done with the full and complete participation of the landlord and occupants of the area. We formed a mall commission to oversee the construction of the mall and look after the maintenance and promotion of the mall after construction. We then encouraged, and somewhat insisted, that a regional mall developer, who had already placed an application before the O.M.B. for an official plan amendment, to construct a regional mall near Highway 401, some two miles from our City Centre, to reassess their position in light of the Province's revitalization program and the culmination of that reassessment resulted in the developer agreeing to assemble the necessary land and to construct a regional shopping centre in a two block area as a southern anchor to our pedestrian mall in downtown Cornwall.

Physically, the situation was just ideal. A large banking institute, the Royal Bank, built a new structure at the northern anchor of the pedestrian mall. It all seemed a fait accompli in solving the downtown problems. The initial shock and reaction to Cornwall Square, the downtown regional mall, by the existing business community adjacent to it, was somewhat predictable. All of a sudden on Main Street was a formidable giant, prepared to do business with the latest commercial techniques and endless promotionalized activities meant to attract, not only the local shoppers, but the secondary shopper and the far distant shopper. This, all of a sudden, meant a revision of strategy on the part of the existing business area and I'm afraid the shock was too great for some merchants to absorb. Some businesses closed. But the most serious problem for downtown was the threatened exodus to an existing commercial community mall in the western section of the City which expanded at the same time. The lines were drawn right there.

Now what has been accomplished so far must be considered as one segment on the road to a healthy downtown. Provincial and municipal help and guidance can only create the initial feasibility. The ultimate success of revitalization must come from the act of promotion and participation of landlords and merchants.

The municipality has provided hard services under the revitalization program. It also improved the traffic flows both in the downtown core and from 401 along the main artery of Brookdale Avenue right into the heart of the City. It provided ample off-street parking and immediately encouraged the formation of a downtown VIA which is now extremely active, playing the dominant role in controlling its own future.

City hall is most supportive of these efforts. City hall is also active, through its planning department, in imposing restrictions, in the official plan, of any other facility of similar size to Cornwall Square. Provisions have also been implemented with zoning land use by-laws that insure maximum residency developments occur within the central business district, also that governmental offices, institutes, professional business offices locate within the immediate area of the central business district. Architectural control and property standards are important areas to be considered by planning departments in protecting the downtown central business district.

As a side-note, it did not take too long for the Directors of the BIA to realize that Cornwall Square, the regional shopping centre, could stand on its own. It didn't need them. But strong leadership in the BIA has approached Cornwall Square and I'm happy to say both now believe it is in their mutual interest to work in harmony. In this way, they, between them, represent the largest commercial unit in the entire area.

It was quite plain as a City that we not consider Phase 1, the Pitt Street Mall, and Phase 2, Cornwall Square of the downtown revitalization, as solving the downtown problems. There were obviously other components that must be present to revitalize Cornwall's downtown. Some that come to mind are, diversity; the use of downtown to include those uses that mix well together and support and complement one another. You must encourage inner-city residential preservation and redevelopment, keeping more diversified classes of people living in the downtown area. You must continue to encourage any new commercial expansion and growth in the downtown. The construction of a multi-used complex to house, for instance, the new City Hall, offices for provincial or federal agencies, and possibly local government levels, along with recreational and cultural uses. The concentration alone of municipal staff in one building would, by itself, help strengthen the activities in downtown.

Our municipal administration is scattered all over the city. We are now planning to concentrate it downtown. We, in Cornwall, have already planned the construction of a new hotel complex located in the downtown which will be extremely beneficial.

Then, of course, there is the private sector. The private sector must play an important role in any downtown revitalization if revitalization is expected to succeed. Any government sponsored project should be considered as a catalyst to further development and improvement in downtown.

In summary, the relationship between Cornwall Square and the older retail area of the city is somewhat pleasing to watch. The regional centre has provided a tremendous magnet for downtown. It provided 1100 additional downtown parking spaces. It also provided an interaction between the centre and the Pitt Street pedestrian mall that is rather amazing to witness. The actual regional mall has a stone sidewalk across one of the lawns because the people were walking back across the lawn and they actually had to go out and build a sidewalk to allow the people to interact between the pedestrian mall and the regional centre. There are individual merchants, of course, who declare the older retail area of downtown will never be the same, and I agree. It will never be the same. Cornwall central business district will have to learn to live and work in harmony with a formidable giant in its midst.

The footnote, of course, is the fact that the general economic conditions right now of inflation, high interest rates, and tight money supplies are a problem to continued downtown revitalization. We have in the books in Cornwall alone, about 20 to 25 million dollars worth of development just waiting for viable financing.

Another footnote is the general acceptance of downtown revitalization by the community. Unless revitalization is sold in a public-relations atmosphere to the community, much of the emphasis of revitalization will be lost.

O.D. Gay:

President of the Downtown Council of Minneapolis, Mr. Gay has a long history of taking part in civic and business organizations and activities. He was a former business executive with a number of firms.

When I arrived in Toronto I almost turned around and left because I saw three things that Toronto has accomplished that we have been unable to accomplish in Minneapolis. One is a good transit system, two is apparently a good freeway system, and three is tremendous downtown housing. We're making progress on the latter which you'll hear about later. We've got one freeway coming in the downtown and one being completed, one that was aborted and one that's running out of time for Federal funds to finish it but we think we might get that one yet.

You'll find there are many similarities between Grande Prairie, Cornwall and Minneapolis. The downtown revitalization of Minneapolis was started from fear. We too, started a program to beautify downtown except we put trees and vats and flowers just to make some of the streets prettier, and my sister used to get up at 6 o'clock every morning to water them. The Downtown Council of Minneapolis was formed in 1955. It's a non-profit, business oriented organization. We were formed from fear. General Mills, one of our largest downtown businesses had announced that they were going to build a new office building in a suburban location. A few businessmen went to the Chairman of General Mills, Mrs. James Ford Bell and said, 'won't you please reconsider',and in effect he said, 'nobody else cares about downtown, why should we?'

Shortly thereafter, Dayton's, our largest department store announced that they were going to build Southdale, the first regional, all weather-conditioned shopping centre in the United States. The same group plus some more then went to the Chamber of Commerce and said, 'what should we do? Are we riding a dying horse? Is downtown going to die? Is there something we can do and should do? Please tell us.'

The Chamber formed what I hate to call a blue-ribbon committee. The committee came up with a suggestion which was immediately adopted that a separate organization should be formed because the Chamber had members from the suburban areas and outlying areas who would be very upset if they spent too much on the downtown, which I think is a mistake.

We found that the first and most important thing was to upgrade the planning effort. We did not have a good planning effort and you heard that in Grande Prairie that was one of their most important things. So we convinced the City Council of Minneapolis — I'm speaking for the private side — whereas Mayor Parisien spoke from the public side — we convinced the City Council, not without great debate, to upgrade the planning effort and they came up with a comprehensive master plan for the whole City of Minneapolis, including a plan for downtown Minneapolis.

The second thing we decided to do was to take inventory. Where were we; what needed to be done; what needed to be forgotten about? It would have been unrealistic in 1955 or even today to say that everything downtown today should stay downtown. There are certain things that no longer belong downtown because of changes in technology, transportation, and other things.

The third thing we decided was that we should attack problems before they became a crisis. When they become a crisis you react from fear, you react in haste, and make many wrong decisions.

The fourth thing we felt was there had to be strong public-private cooperation and, in our town, labour as well is an important part of that partnership.

The fifth thing is that downtown is everyone's job. Most people think it's just the retailers' problem. That is not so; the retailer can move to a suburban shopping centre but the fellow that owns a building on a certain street can't move that building, so our downtown Council is composed of financial institutions, retailers, media, utilities, building owners, restaurants, hotels, movie theatres il Everyone who has an interest in downtown and some who aren't even located downtown.

The last thing we decided is that the job is never done. Then we attacked Nicklen Avenue which is our main retail street. Probably 80 to 90 of the retail business done in Minneapolis is done (downtown) on Nicklen Avenue. It was 50 years old and a building owner not a retailer, said, 'hey, we better take a look at this street.' So we hired a consultant who came up with five alternatives and we picked the transit mall. Incidentally, we had invested $100,000 in downtown council money before the city took it on as a project. As a matter of fact, they thought we were crazy and at one meeting of our executive committee the then President of the City Council said, 'if you are dumb enough to want to do this we won't stop you but we won't put penny one into it' and they didn't. On the other hand, they never stopped their staff from working with us. We worked with the Planning Director, the City Engineer, the City Assessor, the City Attorney.

We did build the Nicklen Mall which is eight blocks long. We wanted it to be urban, not suburban, we didn't want to copy any suburban mall. There are two reasons for the mall's serpentine design: one is that the person looking from here to there isn't going to think it's that far. They don't realize that they may walk four or five blocks, they think they may be walking two blocks. The second reason was it permits you to do a variety of things since you have more space on one side of the street than on the other side of the street at various locations on the 'serpentine.' It was landscaped by Lawrence Halperin of San Francisco. As a final touch on the mall, we have bus shelters and snow melting equipment in the sidewalks, it was a "people place" before anybody else that I know of was talking about a "people place." We weren't even talking about a people place. We just built it and found out it was a people place.

It cost $3.8 million of which $1 million came from two federal grants: one a transit demonstration grant; the other a beautification grant, Lady Bird Johnson was on a beautification kick at that time, and we were able to get $500,000 there. The balance of $2.8 million was paid for by a benefit and property owners.

The other important thing is that today the maintenance of that mall, which is $900,000 a year, is paid for by the private sector, the benefit fund and property owners on the mall and a block in either direction. We can document, on the mall or a block in either direction, $400 million in new construction.

The mall was one of the catalysts that has made downtown Minneapolis a very exciting and a very viable place. If you asked me to refer you to someone in Minneapolis who thought the mall was a mistake, I could not do that. One of the opponents, appeared with my assistant in Erie, New York, and spoke in favour of the mall. He had fought us bitterly, but after the mall was built he turned into a proponent.

We're extending the mall four blocks. It will be completed next spring. We will then have a 12 block mall. The main beneficiaries are the small specialty stores, stores that were nip and tuck as to whether they were going to stay downtown or reduce their operation. Most of them increased the amount of space they had and had tremendous increases in business. It wasn't until later on that the four large department stores got the benefit that they had expected. One of the side benefits was the construction of the Investors Diversified Services Building which is 57 stories tall, the tallest building between Chicago and Seattle, and they could not have built in Minneapolis if it hadn't been for the mall.

At the time that building was open or shortly thereafter, Ken Dayton of the Dayton Hudson's Corporation, I believe, the fourth largest non-food retailer in the world, asked to come to our Board of Directors and that's like Mohammed asking to come to the mountain. We said fine and he came and his message was, 'if you think your job is done because I.D.S. centre is complete, you're missing the greatest opportunity in the world. Your job is only begun. You have the chance here to become one of the great cities in the United States or the North American continent and I urge you to continue on and to redouble your efforts instead of sitting around patting yourselves on the back.'

The I.D.S. centre building pays the equivalent of 100 square blocks of real estate taxes in our most affluent neighbourhood. Where else are you going to get that kind of tax revenue? And there was no public subsidy involved in that building. The average tax payer or homeowner also benefited as well as the city. It is interesting to note that downtown is still number 1 in retail sales.

We're surrounded by a group of outstanding regional shopping centres. I think there are eight or ten but, still, when the federal reserve figures come out each year, it is downtown Minneapolis which is half again as large as Southdale, the first one that I told you about.

We feel that downtowns must have open space, greenery, safety, and an opportunity for pedestrians to circulate freely. The start of our downtown development was a gateway centre renewal area which was 35 acres at the time and was the largest urban renewal project in the United States in a downtown area. At that time, that area was paying $365,000 in real estate taxes. The city told us they were spending more in fire and police protection, because the area was between two railroad stations where the loggers came in when the logging season was over and where people down on their luck hung out. Now that same area, with only a half a block left to be completed, is paying $8 million in real estate taxes, so urban renewal does work.

That again was a combination of private and public cooperation. The Federal Reserve built a building there, the State Employment Department built a building, the Library did, Sheridan Ritz came in, I.B.M. came in. Northwestern National Life, which was on the fringe of downtown and was thinking of moving to the suburbs, moved to what they call the head of the mall (we really think it's the foot of the mall) and have just completed or are completing a brand new building. They thought their last building was going to last them 30 or 40 years and now they have just built another new building which is almost double the size of the building they built in 1962.

We're proud of our skyways. We have 20 now, connecting 16 square blocks in downtown Minneapolis. They are all air-conditioned, heated, carpeted, glassed so that people feel safe on them. We have eight more that will be completed within the next year and our ultimate aim, our master plan, is to have 64 so that you will be able to walk from one end of downtown to the other.

Really, what we're trying to create is a downtown shopping centre. We found that when we made a survey with the City and hired an outside consultant that people did not want to live downtown. The City came up with the idea of building Loring Park on the south edge of downtown Minneapolis to tax implement financing. We supported them and nothing seemed to happen. We formed a separate corporation, the Downtown Development Corporation, and we put up a $500,000 letter of credit. The first condominiums went ahead and we were released from our letter of credit within six months. Then the City asked us to transfer it to the second unit phase and we were released in three months from that. So what the surveys showed were all wrong. People do want to live downtown if you give them decent places to live. We have a mix of condominiums, town houses, subsidized housing; nothing like you have here in Toronto but we have proven, once and for all, people do want to live downtown. The thing we like most of all is that many of the people who moved out to the suburbs, moved out to Lake Minnetaka, are moving back into the City. The children are grown. They want to be able to walk to work, and it is working.

In office space, we now have seven million square feet and we're adding 2.2 million within the next year. Most of that is already rented and whereas, for a while, when these new buildings were announced, no-one was interested in building new space, we suddenly find that everyone is interested in building new space downtown because we are now absorbing 400,000 sq.ft. a year on a normal basis, whereas 10 years ago we were absorbing 200,000 sq.ft.

One of your developers, Oxford Development Company of Edmonton is building City Centre, our No. 2 block in downtown. It will have a new Donaldson's Department Store, Donaldson's is our second largest department store. It will have a new Amphac Hotel, 1,400,000 sq.ft. of office space, a discount subsidiary of Dayton-Hudson and International Multi-Foods.

We find that, whereas we thought we'd have a glut on the market in 1982 and 1983, that is not going to happen. I would be remiss if I didn't tell you that we still have problems. We need a good transit system, one other than rubber tires. We have to do a better job of making people want to stay downtown in the evenings; go to shows, to go to the fine restaurants we have, to get live entertainment back. I noticed last night Peggy Lee is here in downtown Toronto, we don't have anything like that in downtown Minneapolis. We must increase the retail mix downtown; we have a lot of good stores but we need more. We need more national specialty stores.

We need to work with the neighborhood. The nearest neighborhood to downtown is a place called Elliott Park which is where most of the old Swedes settled and it's gone pretty much into decay. They came to us and asked us to help them. We helped them by getting firms to give them expertise il people who were knowledgeable in rentals, in leasing, in land acquisition, in mortgages, in financing, and then, in addition, we went on and raised $1,500,000 for them to do, in three phases, a rehabilitation of their neighborhood. The important thing is that we said to them — that's probably not right — they said to us — we're going to do it our way and we said, okay, and it's working. I think if we went in and said this is what you're going to do it wouldn't have worked but here people who actively oppose downtown redevelopment are now working with us to do projects that they think are important and very necessary and we agree.

We can't rest on our laurels, particularly in the United States with federal/state budget cutbacks. We must create new, innovative, challenging and controversial ways of moving ahead and getting the job done. The City of Minneapolis is looking more and more to the private sectorer leadership. I think if I can reflect the way our Board feels and the way our Executive Committee feels, we are going to give the City that.

John Cristo:

For 22 years, Mr. Cristo has been Unit Manager of the Weyburn Co-op Centre in Weyburn, Saskatchewan. He is a chairman of the business improvement district.

Weyburn is a small prairie city with a population of approximately 10,000 people located in the southwe corner of the province. We are located 75 miles south of the capital city of Regina and 50 miles north of the American border.

The downtown district — business districts — of cities across the country are changing rapidly and Weyburn is no exception. Weyburn however is one city which is doing something to revitalize its downtown core through the combined efforts of the downtown merchants, city council and provincial government. With these efforts, we are sure that the downtown area will remain a retail centre and continue to be a vital part of our business community.

A few years ago, the business sector was under pressure from shoppers in the community to expand via a modern mall route and was under direct competitive pressure from our neighbouring cities, Regina and Estevan. A decision was made that Weyburn should increase its retail shopping space in order to compete. Then there was, of course, the debate. Should this expansion be in the form of peripheral shopping growth or expansion and rejuvenation of the downtown core? We were fortunately able to learn from the mistakes of others that peripheral growth can only lead to severe problems. A decision was made to expand and redevelop downtown Weyburn so the groundwork for a new mall commenced. This was done through the efforts of city council, provincial government, the business community and the citizens of Weyburn. The question the business people and city council asked themselves was — what do we do with the main street which could deteriorate in terms of its current activities and how do we help it through this transition. The business improvement district thereupon was born.

Four business people and one member of city council were appointed to the Board of Management and charged with the responsibility to get the job done. Our main purpose was to enhance the commerce of mainstreet Weyburn with a more specific and immediate function of maintaining the viability of the downtown core areas.

Maybe at this point, I should give you some background into the formation of the business improvement district. The idea of a business improvement district is new to Saskatchewan. It is intended to give business people and municipal councils of each community a means to work co-operatively towards the revitalization of their main street or downtown business. Under a recent amendment to the Urban Municipalities Act, urban councils may designate a business improvement district and appoint a board of management from business people within the district to undertake any or all of the following: improvement, beautification or maintenance of municipally-owned land, buildings and structures in the area in addition to any that is provided at the expense of the municipality at large. Examples of such improvements might be decorative sidewalk paving, trees, flower containers, benches, new lighting, mini parks or other features in order to create an attractive shopping environment; acquisition of property for similar improvements for redevelopment or for the provision of parking if needed to serve the business district, promotion of the whole district as a business and shopping area through promotions, community service and events and other activities.

The province of Saskatchewan and the city of Weyburn jointly funded a study of the pending impact that the Weyburn Square Mall development would have on the central business area. The IBI Group was engaged and consultants issued their report on parking, traffic, zoning, and the proposed integration of existing businesses with the mall site. This report prompted an investigation by a program jointly sponsored by the Sask. Department of Industry and Commerce and the Department of Municipal Affairs.

I should point out to you now that we were appointed for the life of the council which is three years and we are not allowed to incur any debts. We must pay for anything we do as we go along. Three basic sources of finances are available to implement and improve the annual business improvement district program: business improvement district grants, based on $3.00 per capita for a city our size; a tax levy upon all business assessment within the business improvement district at a uniform rate sufficient to raise the amount required for the estimates of the Board and a contribution from general revenues of the city.

There was a total of four proposals presented to the business district merchants. These proposals came under close scrutiny by many and this is good. Each time a plan was rejected, we went back to the drawing board and made the changes that were recommended and would still have the total impact necessary for the downtown concept.

The plan that we finally chose features a beautified intersection at the corner of Main Street and Shores Ave. with planters, trees, benches, refuse containers and greenery. Planters are also placed in mid-block locations to create pedestrian crosswalks. New street lighting has been installed and all overhead lines removed. Trees have been planted along the sidewalks to further enhance the beautification program.

Two major concerns had to be addressed in looking at the streetscaping program. One — should the major use of streets be made for moving traffic or parking cars. Should the streetscaping be designed for the automobile or the pedestrian. We in Weyburn are in a unique position — we have ample private and public off street parking with easy access to and from these lots. There is no doubt in our mind that the pedestrian comes first in our downtown area, the design encompasses both these thoughts.

We were appointed in October of 1979. With so brief a past, we had little time to establish a track record. However, we developed a plan of action and issues which need to be resolved in the revitalization process. One of the tasks we address ourselves to is to encourage business and property owners to maintain the physical condition of their buildings in a manner that enhances both the working and shopping environments of our downtown Weyburn. We will be recommending a standard for upgrading exteriors to be followed by all property owners so that future store renovation will be compatible to the development.

The theme of this conference is "Building for 2001". What about 1981? We have found that the construction of our downtown mall has created a unique one stop shopping area. The concept has provided the maximum convenience for the shopping public and maximum use of parking is being made. Most services are within walking distance and we feel that is the way to go. While other communities will be striving to revitalize their downtown, we in Weyburn feel that we have taken the major step in keeping our business community together. Our role in the next 20 years will be to enhance what has already been achieved and look with pride to the future.

QUESTIONS & ANSWERS

QUESTION: Mayor Parisien, what was the key in Cornwall to getting a private developer involved in the downtown and the downtown redevelopment?

MAYOR PARISIEN: The key in Cornwall was simple. There have been market studies done of the area that showed that there was the potential for a regional shopping centre in the Cornwall area. As I mentioned in my address, a major regional developer had already placed before the OMB an application to go out on 401 which is the main highway from Toronto to Montreal. The focus that we put on was: if it became a viable situation under the downtown revitalization program, would the developer's staff re-examine the downtown? They had looked at it once and said no — that it wasn't viable, that they couldn't assemble the land, construct the building and put up a viable structure for a regional mall. The downtown revitalization program made that possible.

If you will recall, there was $30 million in funds allocated to this program in Ontario and Cornwall collected somewhere around $10 million of that and that made the problem viable and that was the focus that was placed — we demanded the regional shopping centre developer look at the downtown. They re-examined their first initial position. We made the application for funding. We were successful and it now sits in downtown Cornwall.

There's no other secret to it. You also have to get provincial assistance — it was John Rhodes who was the Minister of Housing at that time and the initial application was made through him and it was finalized under Claude Bennett, who is the present Minister.

QUESTION: Mr. Gay, am I to understand that the City of Minneapolis didn't put in any money into the improvements nor has been approached to maintain them?

MR. GAY: That is correct. In our State, we have a law which was passed back in the early 1900s which permitted the city to do sewer, curb, gutter and sidewalk improvements and assess all or any part to the so-called benefitted property owners. When we wanted to build the mall, both our attorney and the city attorney said we probably could do it under the law but we probably would get an injunction and so our attorney re-wrote both the State Statute and the City Ordinance so that we could tax ourselves. It's the wrong way to go. The City has an important stake in this. The people of Minneapolis consider the mall as their mall and that's good, we want it that way, but all the city really pays is the amount they estimate they would have spent on street maintenance, if that were a regular street. I mentioned we were paying $900,000 a year on maintenance. I think the city's share is around $35 to $40,000 — so the total would be $940,000 and the property owners pay $900,000.

QUESTION: Mr. Gay, you mention you have an extensive skywalk system. Now in light of the fact that you are diverting pedestrian traffic from the street level through this upper tier, have there been any detrimental effects to the merchants?

ANSWER: That was the fear — that was the original fear but it has not proven to be as serious as some people thought and two things have happened: one is that we really now have two first floors, the rent on the second floor has doubled and, secondly, the merchants didn't understand what was happening. For instance, I used Penny's because I used to go through there a lot. I would walk through a skyway and I'd end up in the bridal department. Well, how many people are going to buy a bridal dress when they are walking through on a cold wintry day?

Now the department stores and the specialty stores are merchandising. Dayton's for instance — our largest store — completely remodelled their second floor to take the traffic that is on the skyway so we are even talking now — we are going to get into a bitter debate over this — about a third level skyway or a few third level skyways because it permits a person to go from one store to another without ever going downstairs or on the street and we think that if they build third level skyways, that it might have a very bad effect on the first level.

QUESTION: Mr. Cristo — what's the amount of your project per year?

MR. CRISTO: This one budget was a quarter of a million dollars. The total budget including plan and all was a quarter of a million dollars.

QUESTION: Have you still got parking meters in your downtown?

MR. CRISTO: Yes, we do. Why do you ask?

QUESTION: Well, it's a problem in our town and I just wondered if you still had them.

QUESTION: Mr. Bowes of Grande Prairie — do you still have parking meters in your downtown?

MR. BOWES: Yes, we do.

QUESTION: (CHAIRMAN) None of you gentlemen talked much about whether the cities or the towns had used any special powers to assemble the land. That's one of the things that some cities and some municipalities have done in the downtown revitalization process. Has anybody had any experience with that?

MR. GAY: We have used what is called tax increment financing and it has become a real battle. The city will go in, declare a tax increment district and then they will acquire all the property, save what they think is worth saving, raze the rest and then get a developer to come in and they will sell the land to him at a reduced price. They issue bonds to pay for their cost and then the bonds are retired out of the increased taxes realized from the tax increment development.

The best example we have is City Centre done by Oxford Development where, as the city has been burned once, they made Oxford put up two bonds, one of $10 million and one of $28 million. The first was so that they would go through with it and the second, which will not become due until 1985, is that if they don't achieve the tax revenue estimated, Oxford will have to make up the difference but Oxford is already, in market value, almost double the original plan.

MAYOR PARISIEN: In downtown Cornwall, the developer did the land assembly and they turned the ownership of the land over to us on acquisition. We have a rather unique situation in that we, the city of Cornwall, own the $22 million shopping centre. We lease it back at so much a year. They built it and turned it over to us. The key is ours and we lease it back to them at so much a year to pay off the actual amortization of the money needed to do it.

The City put in 2.9 million dollars, the province put in 8.5 million dollars and the developer put in the balance and that's how the financial package was put together but the developer land assembled. He had it practically all assembled before anybody knew what was happening downtown, which is a very good move, by the way, because once people did find out what was happening downtown, the escalation was just unbelievable.

MR. CRISTO: In Weyburn, the province owns the land that the Weyburn Square Mall is on. They bought the land and leased it back to the developers, who, in turn, leased the office complex building back to the government. It's quite a set-up.

QUESTION: Mr. Bowes — did anything happen like that in Grande Prairie?

MR. BOWES: I guess I touched on it in my paper. The provincial government is lending the money to the city to buy all the land and it's not likely they will have to expropriate. They are down to about two parcels and there may have to be expropriation proceedings to acquire the last parcel or two and it's our understanding that there will be one of two things they will do, they will either lease it to the would-be developer or they will sell it. It will be on a long term lease if that's what takes place.

QUESTION (Chairman): A lot of people here are working away on various aspects and various parts of downtown revitalization schemes. It's a long haul and sometimes very discouraging. What's the experience you had where things really turned the corner in each case? What was the event that people might look for to say, yes, now it's going to be easier pulling from now until the end?

MAYOR PARISIEN: I don't think there was any one event. We were very public once the project got underway. We had all our council meetings on cablevision and the developers came in and explained it and the community just fell in love with the situation whereby they were going to get 50 stores right in the middle of their downtown, owned by the community. I think that was a kind of an extra little bit of icing on the cake. When we opened it, we said, this is your shopping centre. It's up to you to make it work and you could just see people with a certain amount of pride in that and they actually made it work. It's working well right now and there's no secret to this but you have to sell it to the community. I don't think you can do this divorced from anyone and then come and say, now this is yours, be part of it. You have to prove that it's part of it right from the start. I mean, it was a thing that people wanted to happen and therefore it happened quite easily.

MR. CRISTO: Well, in our case, it was a decision of whether the mall would be downtown or outside of town and we had quite a battle at the time which way it would go. The reason that we had government involvement is that we needed the power of expropriation in case one or two of the people located in that area would not want to be bought out and be relocated but now that it's in there, it has a lot of acceptance and people are very, very proud of our downtown enclosed mall.

MAYOR PARISIEN: May I just add one thing, — we became the proud owners of a church that was 125 years old. In the two block area the developer was interested in, there was this beautiful old church — 125 years old — and we never at any time dreamed it could become part of the land area we could use for the downtown regional mall so we actually planned around it. The elders of that church came to us and asked us to include it as part of the mall. That's the co-operation we had. They amalgamated with another United Church up the block about a street and now they have a good sizeable bank account which they didn't have before. We actually bought the church.

MR. BOWES: Mr. Chairman, the only resistance we've really encountered has come from owners of land on the periphery and — to a degree — from the people who have businesses in the large mall on the northern edge of Grand Prairie. Other than that, I think there has been generally very good acceptance by the people, at least at this stage.

MR. GAY: We did a couple of things. It took a year and a half to build and in the winter of 1967, Nicklen Ave. looked like Berlin after World War II. So we got the world champion snowmobile driver to come in and race down the mall with a couple of radio personalities and had a big to-do about it just to remind people that it was in a mess. The merchants didn't lose business. People didn't mind that they couldn't get in at any minute.

The second thing we did was, on July 6, 1977, when the mall had been under construction one year, we had a big birthday party and we had a cake in the shape of the mall, surpentine and all. Merchants and other businesses donated money and food and we had a big birthday party on the mall. Everybody was invited free — they came to have a hotdog, cake, coffee — it's the greatest TV coverage you can get and, again, we were reminding the people that the mall was coming — not to give up hope.

QUESTION: I was very interested to hear what Mr. Gay said. My name incidentally is Bob Martin of London, Ontario — the Executive Director of the BIA. And I am getting a lot of mail recently from the States with a concept which is developing which interests me very much. How — not why — but how do you encourage the private sector to become involved in downtown revitalization — the large corporations and the developers? How do you get them involved in that process?

MR. GAY: We have the Chief Executive Officer of the top corporations and we are very fortunate we have many international, national and regional corporations with their headquarters downtown and we even got General Mills back in. They got it started you know by moving out and we got them back in because we said your home address is Minneapolis and now a member of General Mills is on our board.

On the mall, we actually did use blood, sweat and tears. We went door to door. There were three or four of us that went to every merchant, every building owner, everyone who had any stake at all, explaining the five plans to them. We told them how much it would cost and got over 80 approval but it was just door to door, one on one, two on one, whatever.

Once we got the downtown council organized, we used the philosophy that you don't turn over boardships every three years. If a person is interested, if he's doing a job, we keep him or her on. As a matter of fact, I am very pleased to tell you, up until last year, we had a woman who was President for two years so — Louise Saunders who owns Charley's Restaurant.

It's a selling job. The other thing I didn't mention is that, as you build more office space, you are building more customers for those retail stores and one of our major retail stores now have studies that show that 50 of their downtown business comes from employees of the downtown area.

QUESTION: Mr. Chairman, Gord Kranz from Milton, Ontario. I was very interested to hear that Cornwall is the proud owner of the downtown business area.

MAYOR PARISIEN: No, no, the regional mall.

QUESTION: Has any discussion ever taken place as far as the interruption of private enterprise. Are you competing?

MAYOR PARISIEN: No, we are not competing individually with private enterprise. We own the structure and lease it to the developer at so much a year — $209,000 a year is the actual figure — and he pays all the taxes, the maintenance and anything that is done to it. That is our repayment structure as to how we get the money back to the province that was put in this in the first place.

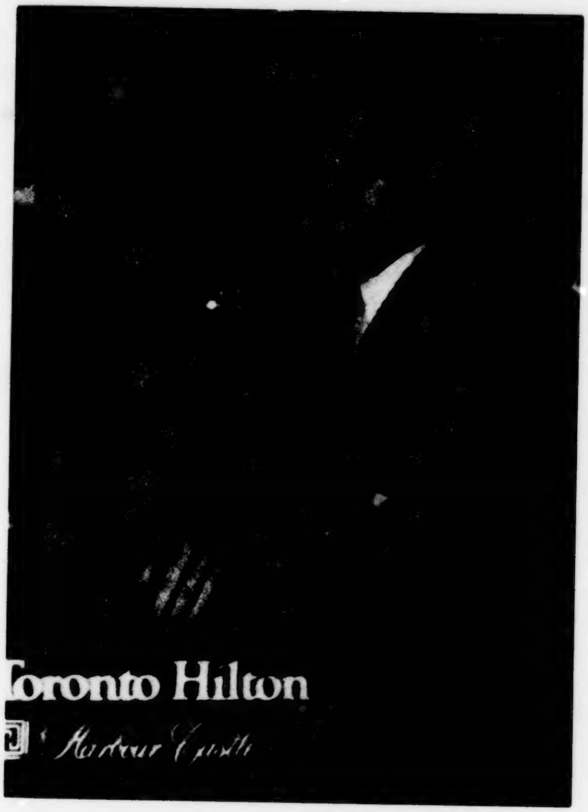
QUESTION: Then you can assume that there is no profit gained by the city.

MAYOR PARISIEN: Except for the tax money that comes in. Before the development, our revenue in taxes was around $67,000; now it's over $2 million.

QUESTION: I'm concerned about the mix that you would allow in your city or area for zoning. I wonder if you have placed into your agreement a certain mix of commercial enterprise and so forth and put it into your zoning by-laws that way?

MAYOR PARISIEN: We have not tried to legislate a mix in our commercial areas. The developer, I think, has a lot of experience in knowing the mix that is required to be a viable situation in any given spot and they look after the tenancy, they look after the type of store that is in. We have nothing to do with that at all. All we do is collect the money which is a nice position to be in.

SUMMARY SESSION



Claude Bennett:
Minister of Municipal Affairs and Housing for the Province of Ontario.

During the past few days, you've been hearing speakers discuss the present state of our older communities and their housing stock. Others present a rationale for the changes that are and must be made in the future. Many panelists spoke about new increasing influences that are overwhelming our past understanding about housing and the communities that we live in. We've also heard from people who are successfully addressing these very issues today and companies which are developing and using new technological approaches to dealing with today's housing needs. We've been encouraged by case studies of innovation methods in which people in this room have been involved and the administrative changes that they are looking at along with the planning problems or the redefined market objectives that one must try to take into his thinking.

One of our major objectives in convening this forum was to create an opportunity for such exchanges, raising our awareness of the issues, discovering and discussing the realistic approaches to these very challenges in discovering the successful path for the future. I would like to share with you some of my thoughts on the issues that we must identify and the various approaches that the Ministry of Municipal Affairs and Housing will be taking over the next period of time.

We've all heard the facts; our demographics are changing, we are going to have a larger portion of one and two person households, and an aging population. More of our communities will have older neighbourhoods that will require our attention. Space requirements and conservation will certainly have an increasing impact, both on new and the existing housing market in the future.

Future thinker William Thompson defines this as a period of transition as our society moves out of the industrial revolution of the last two centuries and toward a new frontier that is dominated by a major shift in cultural values. To Thompson, these changes will be as important as the revolution into the telecommunications and electronics that we hear so much about. Canada, he feels, is experimenting in new political values and a new federal experiment could be important as an example to the rest of the world.

We've also heard from other speakers who were wrestling with the whole question of new values and new technology. There are opposing views on how our communities will look in the future. At Monday night's panel discussion, two gentlemen were on the side of the issue which dealt with the cities of the future and how they will be covered with a huge, expansive and artificial sky and on the other side, there was Ralph Erskine, an English architect living in Sweden who says, 'forget about designing for climate, when you design cities, you have to design for people.' His Arctic city of Resolute Bay, designed with a protective wall containing essential services is an alternate to the domed approach.

How does the public attitude respond to these various but inter-related influences? As the Minister of Municipal Affairs and Housing, I commissioned a major study called the Longwood's Report on public attitudes and perceptions of current and future housing needs in this province. People were asked how they felt about purchasing new housing, the desirability of renovations, space expectation, new options in accommodation, whether they were planning to move in the future. The questions asked of them and many of the results we found echoed George Gallup's remarks at Monday's luncheon. Mr. Gallup has made many studies that show the American public is also turning to renovation as a new way of providing for housing needs.

Our survey was conducted in April of this current year and it produced a number of similarly important findings. For example, fewer people anticipate moving over the next five years, than moved in the past five years. There was a strong interest in upgrading and renovating. People are thinking about fixing up rather than moving up. In fact, repair and upgrading of existing houses was considered to be the most — and I underline the words, 'the most' — attractive option for meeting future housing needs. Complete renovations were not far behind especially in the Metropolitan Toronto area.

While there are certain economic considerations for not purchasing a new home right now, there is ample evidence that the decreasing number of young people coming into the new housing market means that there will be a long term trend in that direction.

But I've said before and I repeat here that new housing is not passe at all. New house construction was seen as a most attractive option for meeting the future housing needs, especially if linked to the space and energy conservation issue.

In this country, Canada, there are more than 8 million existing homes and of those 8 million existing homes, at least 50 percent are in need of some degree of repair; many, if not most, could benefit from energy related improvements and I would have to suggest to you obviously the market is there for those who wish to take part.

In addition to the opportunity to improve our housing, there is a need to recognize the public's changing attitudes towards the size of the house. The Longwood's Report found that, for a variety of reasons, including but by no means restricted to the economic pressures, the majority of the 400 Ontario people that were interviewed said they were considering the merits of a smaller house in the future. This is not only unique to this country. The National Association of Buildings in the United States has found a significant increase in the number of people looking for smaller homes over this past year and a recent essay in Time Magazine depicted the need for Americans to reconsider their housing needs, with shelter so expensive to build and once built to heat and cool. The writer from Time Magazine feels that ultimately, the answer to the American housing problem will be found in better design and better technology. I have listened to many experts over the last few years and then, having made the commission for the Longwood Report, I was interested in Dr. Gallup's comment that public opinion has traditionally had a better track record of predicting change than have the experts.

It appears, stimulated by smaller family size and new life styles, there will be a growth in the demand for smaller housing units. This trend will be helped along by higher energy costs as well as by better technology and improved space planning. The Longwood Report further indicated that most people like older buildings. They wanted to see established areas rehabilitated and improved and there was a real desire to access to more information about renovation and energy.

I believe this public demand can be met through a collective effort between the public and the private sector. We can learn to work closer together in helping people to better achieve their housing needs and their desires and ultimately there are significant rewards to be gained by the private sector especially.

Last year across Canada, almost $3 billion were spent on major housing renovations. Another $3 billion went towards residential repairs. Spending for both renovation and repairs climbed over previous years while spending on new housing dropped. There is an even greater potential in the future for large markets. A C.M.H.C. report estimates that between 1980 and the year 2000, spending for repairs and alterations in housing across this country will total $230 billion. This boom will be fueled, we believe, by the large scale energy related improvements and the impact that they will have on housing renewal spending in the future.

The picture is a good one for labour as well as business. Rehabilitation of housing provides twice as much employment per dollar as new construction and over 85 percent of the employment resulting from the renewal, whether it be in this province or in any other political jurisdiction, is created right in that home community.

In a time of housing uncertainties and clear trends towards modifying existing structures, the renovation field is very attractive, we believe, to the small home builder. It provides added flexibility to both investments and for the skills.

There's also a great necessity for more innovation in the housing field. Successful companies will include even greater integration of space and energy conservation in their planning of the future. Clearly, energy conservation by itself is an important sector in the provision of housing but combined with renovation, it's our opinion, it's a bargain for the home owner. Almost every renovation job can contain elements that will contribute to energy savings.

There is no doubt about it, energy conservation is now a consumer issue. You and I do not have to work nearly as hard to convince the home owner regarding energy savings. In our opinion, the future direction is clear. We all know very well that the public will react when they are offered a desirable investment that can return to them 30 percent with a pay-back period of only three years. That's what energy conservation can do. We estimate that between now and the year 1990, about $8 billion will be spent on retrofitting homes and heating systems in Ontario alone. That spending may return fuel savings projected on the figures of the price of fuel over the years from here to 1990, of something in the range of $3 billion.

The business community has seen some, if not all, of the opportunities and the potentials in the whole renewal field and now is the time to bring all of our creative energies together and face the great opportunities which are here today and are continuing to grow. In the housing field, I sincerely believe the role of the provincial government is to assist in identifying and promoting various options for meeting people's space needs in both new housing and existing housing and I believe that now and in the future, people will re-evaluate their housing needs within the context of their space and energy requirements. This is directly linked to the trend towards smaller family sizes, demographic changes and the rising fuel costs that we are experiencing.

It is this province's objective to provide information which assists the public to more easily maintain or obtain housing. Furthermore, as we continue to build the process of meeting the future, it is the intention of the provincial government to work co-operatively with industry, with municipalities, with lenders, builders, to enable the public to actively pursue their individual and common housing goals. There are five important areas where the provincial government can help in this process. (1) effective enabling legislation, regulation and standards. (2)

research data to assist decision-makers. (3) education and training. (4) demonstration programs and prudent financial assistance. (5) public information and promotion.

I am delighted to say that our Ministry and this government has already begun in this area and I'd like to give a few examples. Legislation and standards play an important role in the housing and energy conservation field. In recognition of this, the Premier, Bill Davis, last year directed a task force to examine the benefits of introducing residential renovation guidelines that would lead to more effective renovation of older buildings for residential uses. I am pleased to release an interim report on their work to this time. This is a very complex issue and it's being addressed by a broad representation of the various working committees from across industry, the professions, government and the housing related agencies. I expect that their work will be completed sometime in 1982 and I will be then releasing a draft report which we hope will draw a fair amount of public comment.

In the last few days, I've introduced into the legislature of this province, a new Planning Act. The Act specifically identifies supply, efficient use and conservation of energy as a matter of provincial interest in the planning process and there's also a requirement in the new Act for a community improvement strategy which will allow municipalities to establish official plan policies governing comprehensive community improvement activities in their area.

Also, during this past year, a training program was introduced leading to the certification of insulation contractors. The program, administered by the Canadian General Standards Boards, ensures that insulation contractors meet certain standards in the course of their work. I am releasing a progress report on what is being done in Ontario to apply this standard.

We must clean up our language. A glossary of terms is needed to help set standards in the housing field. There's often confusion in the marketplace because the same word such as "renovation" may have one meaning for municipal officials and another for home improvement contractors. I'm releasing a draft glossary on housing renewal terms that I'll be asking various groups to review so that eventually we can develop a common meaning for these key words. This draft has already been discussed with many of the major organizations and a fair amount of common understanding acceptance has already been indicated.

In the field of research and data, we have undertaken or will be pursuing various projects and studies. A caulking and weatherizing test is being conducted in sixty houses in four communities across the province of Ontario to obtain specific knowledge on the benefits of this procedure and my staff are working on ways to assist. I must say the municipalities were co-operating with the utilities on this experimental project in developing policies effecting their existing housing stock.

I'm also pleased to announce today the formation of a joint study group between the Ministry and the Association of Municipalities of Ontario to consider ways in which each of us can have an impact on existing housing stock and to look at ways that we can both increase the effectiveness of our respective roles. I know, for instance, there are a few mayors and others sitting in the audience who know that local zoning by-laws have a tremendous impact on housing. It is one of the areas that we will be spending some time examining.

A residential energy inventory and discussions with Statistics Canada on improved housing renovation data collection are two other examples of initiatives that we will be undertaking. My staff is also discussing with the city of Toronto a possible pilot project to improve its data on municipal housing rehabilitation.

I wish to announce plans for the establishment of a Secretariat within the Ryerson Polytech Institute. This multi-disciplinary group will be examining ways of promoting the effective design and renovation of our buildings and communities in cold climates and four season environment.

Education and training in the housing sector will continue to receive support from the Ministry of Municipal Affairs and Housing, as we react to accommodate today's needs. One area of attention could be the upgrading of skills among property managers in controlling energy operating costs of residential buildings. Another area which is of great interest to a number of us here today is the training of property appraisers to determine the effect energy related improvements have upon the property value.

In the municipal field, we will be continuing our educational activities for municipal inspectors involved in housing renewal. With respect to financial assistance, some time ago, I announced the availability of provincial funds under the new Neighbourhood Improvement Program. These funds assist municipalities in upgrading public components of older neighbourhoods that are in need of improvement. The program is structured to fill the gap caused by the sudden termination of the federal services contribution program. The response has been significant. To date, we've received some sixty-eight requests from various municipalities for better than $60 million for the year of 1981/82 projects.

An essential element in our efforts relates to a centre where people can get complete, accurate and up-to-date information on housing renovation and energy conservation techniques. This winter, my Ministry is opening a demonstration house here in the City of Toronto which will illustrate specific approaches to renovation and energy conservation. Its primary function will be to act as an information centre, displaying techniques and demonstrations where individuals can get the latest answers to their questions about how to renovate their homes and make them much more energy efficient at the same time. The demand for clearer and practical information from our understanding is great. I want to offer to all of those who come from beyond the province of Ontario the lessons and the information from this first project to anyone who requests it. We believe it will be significant.

I will be discussing with officials from the building industry ways in which we could establish an effective housing resource centre here in Ontario. There are similar centres in Europe that are successfully assisting the public, the home builder, the government official and indeed a great number of others in acquiring new information that is needed. Finally, I would like to close with a few words about a joint housing energy management program between my Ministry and the Ministry of Energy. A variety of studies and projects are underway which address many aspects of energy conservation including a study in energy savings to be gained in the operation of large rental and condominium buildings. In addition, a recent survey shows that as much as 15 to 20 percent of the energy used in conventional subdivisions can be saved through careful community planning and at no extra cost to the developer. Also, grants are available to municipalities to re-examine their planning documents to ensure the most effective use of energy in their communities and so it's my sincere hope that this blend of legislation, demonstration and information will help to encourage the development of new approaches, to dealing with the changing housing needs of this country.

These initiatives will succeed only if we all join together in an effort to meet the challenge. The rules will be different as will the strategy. We know the stakes are extremely high. The thinking we have heard at this conference gives us a strong sense of optimism. The positive start you make today, whether it be in this province or in other parts of Canada or the world, will be well regarded by those who will attend conferences of a similar nature over the next five, ten or more years.

Robert Welch:
Minister of Energy for the Province of Ontario. Mr. Welch is also Deputy Premier of Ontario.

The name of this conference, ladies and gentlemen, underscores the necessity of planning and creating the housing climate that will be needed over the next two decades, taking into account as it does such emerging factors as changing demographic trends, new applications of high technology, increased energy prices and the development of alternative energy forums. You see, when we think of building towards the next century, images from those space movies in the '50s may spring to mind; futuristic domes and what some would refer to as 'way-out' designs. Therefore, it's interesting, if not quite so glamorous, to remember that two thirds of the buildings of the next century are already on the ground.

As the Minister of Energy for this province, my first thoughts for the coming decade and indeed for the next century of housing quite naturally focus on energy or more to the point, conserving energy and, in doing so, finding ways to lessen our dependency on oil. That's the name of the game right now, crude oil self-sufficiency for Canada. Indeed it's one of the most important mandates of my Ministry.

We have in this province as many of you will know, very specific energy targets that will have an important impact on all sectors of our society by the year 2001. Policies of your government in this province based on our province's resources and on our opportunities are centered on three basic strategies, energy conservation, oil substitution and increased Ontario energy production. As a major energy user, we intend to do our part to help this country of ours attain the national energy goals of crude oil self-sufficiency by 1990.

Slightly more than a year ago, I had the opportunity to put all of our energy conservation and oil substitution targets under one umbrella when I announced a ten point energy program. This package then became and still is the symbol of our commitment to the energy future of Ontario. What better place to start than in the community? So I would like to tell you about our work with municipalities since they have a great deal of influence on how energy will be used in the community. Since municipalities can greatly influence the wise and prudent use of energy, a large part of our strategy is concentrated on programs for local governments. We assist them in their hiring and training of competent staff to carry out energy audits of their own operations and with the information, they are in a position to establish or expand conservation programs. In our ministry, we've set aside $3.6 million for this purpose and my ministry provides the funding and the Ministry of Municipal Affairs and Housing administers the program. Our two ministries also jointly conduct an energy conservation through land-use planning programs to which my colleague made reference and I hope that you would agree that this is proving to be very popular with our municipalities.

In addition, the Ministry of Energy has a $12 million program that is proving very effective in helping municipal government buildings and hospitals and schools and other public institutions to conserve energy and to convert their oil furnaces to more abundant energy forms.

We knew that our commitment really couldn't end at this particular point. We have to involve the community at a more grass-roots level so I invited municipal governments to send us proposals for developing community energy management plans and ways to put these plans into action. The project must include an assessment of the community's energy situation, specific targets and goals, policies, strategies and community outreach activities to achieve those particular goals as well as methods of monitoring the results of the project. You see, we feel it's quite vital to involve the whole community in the wise management of energy and I take a great personal interest in our Ministry's work in this particular area.

Many of you may be aware of our Ontario Energy Savers campaign which has received a good deal of public interest, stimulating as it does and as it must continue to do with your help, a high level of awareness in this very important area. The aim of the campaign is to provide helpful tips on how to save energy in the home, on the road and on the job. Because community involvement is so important to energy conservation, it's a great pleasure for me to congratulate the City of Toronto for developing a community based action plan and outreach project, Energy Conservation Community Outreach or, as it will be known, ECCO. This pilot project is jointly sponsored by the city and the Ministry of Energy and information on both the federal and Ontario government's energy programs will be delivered simultaneously on a community basis. This includes advice on home insulation grants, oil substitution and home energy audits, heat save clinics and retrofitting and programs of information. The city council is looking for a cost effective and comprehensive program, one with immediate practical applications and measurable results. So are we. The audits and the applications and the outreach will take place during the early cold months of this coming winter and the results will be assessed during the following year. It is a very practical program.

One step is, for example, to promote the lessons learned through the super-retrofitting of a typical Toronto house by the Ministry of Municipal Affairs and Housing. Housing obviously is one area where there is a lot of renovating happening right now. Renovating now means saving on retrofitting in the future. I think this pilot project is important at a time when home owners are facing uncertainty at so many levels. There's a lot of confusion out there in the marketplace. People are looking for some advice and some information and are indeed anxious to take very important decisions based on that information.

What I've been talking about ties in very well with the program of the Ministry of Municipal Affairs and Housing, the heat save clinics which use aerial thermography to identify where heat losses occur in homes followed up with expert advice to home owners wishing to improve their homes' energy efficiency. Clinics across Toronto will begin at the same time that the City of Toronto's project starts up and of course those of you who come from other parts of the province will know the success that we have had in so many municipalities with these clinics.

There are other provincial government programs that provide assistance for energy conservation while existing for other objectives. For example, one would include in such a list, the Ontario Home Renewal Program. My personal knowledge of that program goes back to about 1974 when, as the Minister of Housing, I had the pleasure of overseeing its initiation. This program was set up to provide assistance to qualifying home owners in upgrading their own residences and the province has provided funds to almost 700 municipalities across Ontario.

In addition to the work on the existing stock of housing, we are also promoting energy efficiency in new buildings. In fact, our ministry is working with the Ministry of Consumer and Commercial Relations in the revision of the Ontario Building Code in line with new priorities.

Buildings, both old and new, simply have to use energy more efficiently now than they have ever done in the past and this, then, provides us with a challenge to find some new solutions. I am very pleased with the results of the co-operation between my ministry and the Housing and Urban Development Association of Canada in many areas. One important area involves the building of passive solar energy efficient homes. Twenty homes have been built incorporating energy efficient and passive solar energy designs and I'm told that the average saving on fuel bills is estimated in the range of 45 percent over a conventionally built home.

This conference proves, you know, that interest is really growing in building more energy efficient housing under a number of new design concepts. These range from arranging large south-facing windows which make use of passive solar heat to the more futuristic concepts such as the thermal home constructed along the lines of a thermos bottle with double walls. There are a lot of important initiatives. No one has a monopoly on good ideas as you've learned and they are taking off, proving increasingly effective as they gain increasing public acceptance.

Acceptance is really the key. More and more people are proud of the results of insulating their homes and caulking their windows and making their furnaces more energy efficient, increasing the gas mileage of their cars through proper driving practices and sustained care. More and more I think, it will be demonstrated that conserving energy, using it wisely and prudently in our lives, results in no hardship. Indeed, just the opposite. I'm here to suggest that it can really enhance the quality of life. I came across this quotation from the Royal Architectural Institute of Canada. It did a comprehensive study of energy conservation design. I think the institute made a telling point about new building direction when it stated this in its report: "A good design will take advantage of the requirements for energy efficiency and make something better than it would have been without this priority." I think we can get to the year 2001 with a better energy record and a better housing stock than we have now.

Gus Handegord:
Co-ordinator of Building Technology for the National Research Council, Ottawa.

I have to speak as an individual really not as a representative of the National Research Council or the Division of Building Research. I caution you though that my remarks are conditioned by the fact that I've been involved with the building research operations since about 1948 and with the construction industry since 1946. One of the things that happens when you get older is — you worry about definitions. And definitions of research are difficult. They can range all the way from the 20 years of work in the laboratory that gives you the Nobel prize to the CBC definition which is to go and look something up in the library. It's no criticism, I think, both of these are research. It's learning something more and when it becomes good research, it has an element of discovery in it and this is what's stimulating about it. Our first director, Dr. Robert Leggett gave a definition of research which was from Francis Bacon and that was "the ability to ask the right questions and appreciate the right answers." The former head of our section on noise and vibrations, Dr. Tom Northwood, had a good definition of building research. He said that building research has to begin and end in a building because if you don't go to the building to try and figure out why it is operating the way it is, you are in very great danger of solving the wrong problem in the laboratory. I think this is true. He further said, after you've formulated your hypothesis about what happens, to go back to the building and try it out again in the real world. This is one of the dangers and the problems of building research and I think with energy conservation is because the practitioners seldom have time to go back and see if their system works. They only go back when there are complaints and then is the question of deciding responsibility more than solving the problem.

We've been privileged over the years to be able to go back and look at buildings and try and judge why the things happened, why they worked or why they didn't work but not enough of this has been done.

Another area is 'demonstration projects'. In the past, I think, many demonstration projects simply demonstrated that something could be built, not whether it's going to work or how well it works. The pressing thing in my mind in connection with monitoring is to go back and look at the building, to make measurements, to decide fairly as to whether it accomplished what it did, or didn't but, more particularly, why it did or why it didn't. One of the problems with this is that we tend to think of research now in developing systems that enable us to make decisions and this really means looking for the mean or the norm or the average. Of course you have to realize that the average doesn't exist in the system. In fact, I tend to think that the search for the average and the regression curve is the curse of the research business because it tells you about something that doesn't exist. It's very well to do this in terms of establishing rules, regulations and norms but really we should be looking at the reasons for departure from the norm and not the norm so much. Houses are different and the occupants are even more different.

I think we are looking towards an age of involvement in Canada. The age of involvement, I think, is evidenced by the fact that it's a do-it-yourself society and that influences my thinking a bit.

One of the other problems is that there is much published information available as you can witness from the resource centre. In fact there's too much information and one of the problems is that much of this is overshadowed by the enthusiasm to publish before the other steps are taken and the publication is reviewed. Harold Orr said to me last night that he heard one fellow say that he had published a book on how to do something and it got to be a best seller before he found out that it didn't work. Now that's a sad case but I think it's a very perceptive view of this thing.

We have to be concerned about the users of publications and whether the publications are adequately reviewed and that may be the best use for experts, to review publications rather than doing anything else. You have to understand each situation and maybe the occupant is the best person to do this. I push strongly for training and education as everybody does but I would suggest that maybe the home owner is often better able to understand his or her house than the experts. The expert is plagued by the fact that he has preconceived notions and biases. You see, if the home owner doesn't know anything, he starts out from scratch and can probably do a better job in many instances. He is like the G.P. in the medical profession. A specialist is conditioned by experience. I'll leave you with one suggestion that came to me during this time and that is that it goes to the point of saying the home owner is the best person to examine his own house, to do research on it and to audit it. If he's not interested, perhaps we should use this as a project for high school students. After all, the business of energy conservation is simply applied physics at the level of high school. If, for instance, we can persuade the high schools to have their senior students look at their own house to evaluate its energy loss, to look at what effect some improvements might be made and then subsequently to analyze this and feed it back, a marvellous system would develop for evaluation. In the meantime, we would be training the students to do this.

I think on an optimistic note, there is a great similarity technologically between new housing design and existing housing. The same principles apply. It's a question of phasing the development. We might even consider phasing energy conservation in new construction. This is not a new idea. It's an old idea. The small homes council used to talk about the expandable house. You built the house with the idea that you could expand to take care of your expanding family. Now another solution to this of course is to move to a bigger house. However, that house was built for something else so I think we should think of mobility and development of these in a phase of appropriation. Now I don't know how we will respond to the Minister's suggestion that people want smaller and smaller houses but maybe we can simply sub-divide the house. Then the occupant becomes the sub-divider and can then claim fame in knowing something about the situation. I'd just like to close by saying that I think the problem is that we need all to know more and I'd like you to think about a final definition and that's Webster, an authority. His definition of technology is "the application of knowledge" — not the application of mini-computers.

Peter Burns:
Chairman of HUDAC Ontario Council.

I want to spend a few minutes talking about the short term outlook for housing because I believe that this can have repercussions which may be rippling through the system some years from now. The Canadian housing market, particularly the market in Ontario, is in far worse shape this year than the figures coming out from the Federal Government. Personally I think they've been playing a bit of a numbers game in that they took the starts of the early part of this spring where we experienced a bit of a housing boom, related those starts to the same period last year and said, look, housing is doing very well this year. But 1980 was the worst year for starts in this country in fifteen years and we are not doing very well and the figures that are now coming out on the predictions for the year are starting to substantiate that.

What has actually happened is the industry, over the past five to eight years, has dropped from producing around 275,000 units in Canada to the point where this year, we will be lucky if we get more than 160,000. Ten years ago, Ontario accounted for 40 percent of Canada's starts. This year, Ontario will count for about 25 percent, about 42,000 units. Next year, even if interest rates come down to about 18 percent, we estimate starts across Canada will fall to around 150,000 units. Ontario will hit a thirty-year low. Builders who have managed to hold on by the skin of their teeth through the downturn of the past three years (and not all of us have) face an even worse year in 1982.

Renovation is the one bright spot. I think that's what this conference is all about. Conditions have not been as bad as in the new construction field. Some developer-renovators were stuck with renovated homes when the market softened this year but contract renovations have continued to accelerate as people use their savings to upgrade their homes rather than move up through the new house market. The high interest rates and the caution of lenders for this new type of industry is discouraging project type renovations, which is the only way we will achieve any meaningful volume. That's the picture of the supply side of the market.

On the demand side, we see a number of tensions building up. Based on the age distribution of the population and net immigration, the estimated housing needs of this province in 1981 was about 64,000 units. We are building 42,000 units. This kind of unfilled demand is creating noticeable pressures.

One of the most serious pressure points is the rental market. I think in most urban areas, we are seeing virtually a zero vacancy rate. Certainly that's the case in Toronto, in Ottawa, it is moving that way in London. People who would normally be buying homes are not doing so because of the high mortgage interest rates. They are continuing to occupy apartments which are a bargain in terms of monthly financial outlay. Many of these people should have been first-time buyers, moving up through the market. Instead they are contributing to the very critical shortage of vacant apartment units. A new program to spur rental construction, such as the Ontario Rental Construction Loan program, find themselves floundering on the same problems of high interest rates which are affecting the entire shelter industry, both for new construction and for the roll-over mortgage interest rates. The pressure is building on the waiting list for public housing. I see it in Toronto — talking to the Ottawa Regional Housing Authority, they are seeing the same increase there and it's obvious that, as the higher incomes stay in their apartments, and apartments are not being built, the pressures are at the bottom end. Every day that current situation continues, it contributes to pent-up demand, growing pressure on the rental market, contraction of the building industry, loss of skilled tradesmen and when interest rates settle down and the market turns around, there will certainly be an explosion of housing prices. There has to be a catch-up period.

Having said that, I would like to look at where we have come over the past twenty years. In 1961, inflation was about 4 percent, mortgage interest rates were less than 7 percent and in most cases, rates were fixed for the length of the mortgage. The planning issues were: revitalization of downtown areas, clearance of slums, and building of public housing, urban growth and urban planning. Buying of land for transportation corridors and open space for recreational community purposes were high on the planners' priorities. The focus in new construction had already altered significantly with the sudden surge in rental apartment construction.

Over the past twenty years, we have been through massive urban growth, mainly in the suburbs, leaving behind the inner core. It's only in the past few years that the stream of people in the suburbs from the downtown area has tapered off and the downtown is becoming the more fashionable place to live. I'm sure that we are going to see more redevelopment of the downtown core. Urban development will be a combination of areas mainly for the rich along with areas for the poor with residential, commercial and retail mixed uses but it will be to the detriment of the poor in many inner-city areas.

Twenty years ago, town houses were a very new proposal. We saw the surge of them through the AHOP program. The condominium was a completely foreign concept, large rental projects, student housing and senior citizen buildings were the up and coming thing. It's only in the past three, four, five years that energy conservation has become an important issue mainly courtesy of OPEC. Prior to that the new housing industry had switched from oil to gas heating but primarily for economic reasons.

Where are we going over the next twenty years? First a few basic assumptions: the most important assumption is that interest rates will moderate to about 18 percent. That's still high but relatively speaking, I think it will kick off the market again. The U.S. will win the fight against inflation and that obviously spills over into our country. If this does not happen, I see a continuation of the inflation that got us into this mess in the first place. I am optimistic that we will win the fight against inflation. However, this will mean a period of belt tightening over the next few years. The federal budget may tell us how much additional belt tightening we are going to be faced with.

First time home buyers will certainly be changing their aspirations. In the '60s, I think most of us starting off were quite happy with 1,000 sq. ft. bungalow and the one bathroom and the gravel drive. Our children are looking for the large house with 1 1/2 bathrooms minimum and a garbage and so on. I think that will be switching because the disposable income for that down payment and for the mortgage payment is tightening.

The renovation market will obviously continue to grow as more people upgrade their present accommodation. Neighbourhood consciousness will increase. Conservation will become a more important issue in every area of housing both new construction and the retrofit. The renovation market currently represents about 15 percent of the total spending on residential construction in this province though I've heard other figures over the last couple of days but it's not a significant force to this point.

There are approximately one and a half million homes in this province alone that are more than twenty years old and in various states of repair. Most of them will need upgrading before the end of this century. Before long, we will see more dollars spent on renovation than on new non-highrise construction.

The aging of Ontario's population will play a role in this as many people prefer to convert large dwellings into two or three smaller units after their children leave home. Municipalities are going to have to take a very serious look at their zoning by-laws and their building by-laws to encourage this and to accommodate this movement. This will help the rental market as well as allowing older people to stay in neighbourhoods which they are comfortable with and I think we will see more conversions of both older homes and commercial and industrial buildings. We are seeing that in the conversion of schools now, which are no longer required for their original use.

HUDAC Ontario is very much involved in developing 'rehab' guidelines for the assistance of our members. We've been working closely with the Ministry of Housing, the Ministry of Consumer and Commercial Relations, Solicitor-General. We want to start talking more about zoning by-laws which is a local issue. We are talking about warranty programs; should there be one, should it be voluntary, should it be mandatory? We are encouraging the formation of warranty councils within our local home builders' associations to encourage participation by people in the renovation industry within our association.

The renovation market, I think, will continue to be dominated by the smaller firms, since by the very nature, renovation is more of a custom oriented market. The number of firms that are currently involved in new house construction only are answering this market and will continue to do so to meet the growing demand.

HUDAC Ontario is exploring, with C.M.H.C., the possibility of adapting a training program which they have for inspectors for the use of our members so they can upgrade their skills as they move into renovation which is a very different operation than project construction where everything is almost assembly line.

Today energy conservation is added to renovation contracts almost as an afterthought. This will obviously change and become paramount. However this future is not on us yet. Passive solar construction will be an essential part of the future housing market but customers of new housing are not yet ready to buy just because of the solar orientation of that house and they are not prepared to pay any particular premium for the super-energy efficient program and they are not willing to accept designs that make that house look very different from the house that they are normally used to buying.

I feel that we must tread very cautiously as we move into the heavy conservation of energy. HUDAC has been in the forefront of research and will continue to be in that field. We are discovering problems with current conservation techniques, increased moisture, build-up of gases, truss uplift, rotting of sills . . . The federal Department of Energy, Mines and Resources on the other hand has its emphasis on cutting back the consumption of energy and really has a barrel per day philosophy. It seems to be in a rush to set standards for construction rather than guidelines. Maybe I'm being a little cynical when I hear them pushing us downwards and downwards in energy consumption in houses at a price which the market is not ready to bear but Ministers all seem to be able to take separate jets off to Winnipeg for almost the same conference and there's a lot more energy there than we can save in houses for many a year.

The other point they are missing is that new house construction is only adding about 2 percent to the housing stock of this country in any one year. The over-emphasis on codes for new houses doesn't really accomplish a great deal. There will be more meaningful gains in the schools and hospitals, in the industrial buildings. That will come obviously but what I'm really saying is the imposing of mandatory standards would be foolhardy at this point. Governments should set performance goals, the building industry has the professionals who could work out the best ways to meet those goals. The techniques must not be forced upon us.

Energy conservation in the housing market will have waned as an issue in the late '80s. It will be expected. It will be part of the price and HUDAC intends to be in the forefront of this changing building technology and to give every assistance to its members in developing viable and cost-productive techniques.

Pressures on our major metropolitan areas will continue to grow with industry's cluster and their employees seek homes closer to work. Levels of new housing construction will not reach the heights of the mid-'70s but much of the growth will be concentrated on a few urban areas and we may well see an increase in public transportation as the price of gasoline for individual driving starts to affect people and we may see outlying municipalities offering incentives to seek new development. Redevelopment of the central areas of the city to provide much needed housing close to employment will obviously continue to grow. Infill makes sense because it chooses existing municipal services. The right to sunlight for solar heat gains will become a major issue in rezoning battle as the industry seeks to obtain sites in the inner core for new highrise construction.

In conclusion, I would like to say again that the scenario I've just painted depends vitally on the fight against inflation. Continued mortgage interest rates in the 20 percent range will decimate our building industry as we know it today. Even if interest rates fall to about 18 percent, starts will be lower in 1982 than they were in either 1981 or 1980. Obviously, I'm not before you as a high flying optimist but as an entrepreneur, we always feel tomorrow will be better. Maybe interest rates will drop. Maybe government will remove rental controls. Maybe immigration will improve and family formation will increase. We look forward to it.

Robert Theobald:

An author and public speaker, Mr. Theobald has written various books on economics stressing ways to benefit from new opportunities and to avoid being overwhelmed by new problems.

It seems to me our problem in all of our work is that we underestimate citizens. We underestimate kids. I've been doing a lot of teaching, talking to teachers and principals recently and my argument is that if we would treat kids as if they were twice as intelligent as we think they are, we would be in much better shape. I'd suggest to you that in this field, if we would treat citizens as if they were twice as intelligent, we would be in much better shape. I hear a great deal said about citizens who are not ready. I think basically, we underestimate and in underestimating we fail to reach them with good, clear, honest, credible information. People aren't as dumb as we think they are. And there's an enormous difference between a program you run to propagandize people, which people are sick and tired of and which they can smell from a mile off and the program which comes to them and says, we have some hard information as to why changes have to take place.

As I've listened today, and as I read many of the speeches, I find you surprisingly complacent. It seems to me that you argue that the changes which have taken place over the last seven years are the end of the change process rather than the very beginning of it because I agree with William Irwin Thompson that we are in the middle of a major transition. We are in the middle of a robot and computer revolution which is why we are not going to keep full employment. We are in the middle of a biology revolution which is going to change the whole way in which we think about what it is to be a human being. We are in the middle of a revolution in relationships between the rich and the poor countries who are going to demand that we don't have as much of the world's wealth. We are in the middle of a migration movement which is moving people from east to west. We are in the middle of a revolution in terms of energy, which we have talked about. We are in the middle of a revolution of recognizing that the environment, land and water has constraints and these all add up to two profound changes which affect habitation patterns.

No. 1; we are going to see an increasing movement away from transportation towards communications. That means transportation of all sorts, transportation in terms of moving long distances to set up new homes; it's getting too expensive so, as we saw in the survey, people are going to tend to stay where they were. There's going to be less mobility. Communication is in the sense of people working in their homes rather than working in the office. The whole issue of how you do house design for high electronic technologies has hardly been touched to my knowledge and yet it's going to be a crucial area of the home and it either can be done to improve living or to damage it. There is a great danger that people are going to vanish inside the television tube. When you can get 12 hours of sports a day, when you can get 12 hours of pornography a day and 12 hours of sitcoms a day, it may be more attractive unless we make the real world better than it is to simply forget that the real world exists. A lot of people who are already doing that; you take a quiz of kids and they will probably give you a better summary of what happened on Dallas than what happened in world affairs last week. We are going to see a world in which communication becomes the dominant force which is why I call the future the communications era but there's a second piece to that and the second piece to that is, we've got to learn to listen to each other, and hear each other and work with each other across the classical boundaries, in this case between builders, developers, municipalities, federal governments.

One of the worst things the industrial era did to us was to make us concentrate on averages, medians and molds which mean nothing at all. There's no average house and there's no average person and planning for it is a mess. That of course is why building codes are going to work less and less well but then that demands the people in this industry become responsible rather than having to have building codes because they were put in because people were irresponsible and will each part of this industry learn to police itself so that it doesn't have to have federal or state government policing. Because if it won't, we will continue to keep rules and regulations which will get in the way of creativity.

The second part of the change is far more dramatic and that is that we can no longer run a society based on maximum economic growth. Maybe I shouldn't say it's far more dramatic. They are equally dramatic. It's much less talked about. The goals of maximum economic growth and the goals of full employment are obsolete, not obsolescent, obsolete and yet everything we do including urban patterns, including housing, is based on the assumption that people are going to hold jobs in the conventional sense. In this decade, more and more people are going to be thrown out of the labour force, particularly more and more women who have just got their foothold in it are going to be thrown out of the labour force unless we rethink what we mean by work and how we achieve the distribution of income.

What's this got to say about the immediate problems? Well, I'm really amazed. I've heard people talking about the smaller family and it's quite true. That's exactly where we've been going. But I will bet you long odds it isn't where we are going. We are going towards the recreation of the extended family. Because people aren't going to move as much, because they aren't going to be able to afford putting people into homes to look after them and some of the extended families, a lot of the extended families, are not even going to be related extended families which is going to open another can of worms for municipalities which have all sorts of laws about you mustn't live in the same house unless you are related.

There's no doubt in my mind that the most urgent problem in architecture and town planning is to re-think what you should do to produce enough housing so that we can afford to give people decent amounts of space rather than down-sizing houses to the point at which they become non-functional and I agree. We are going to go back to smaller amounts of space but I don't want to see that done by making the ticky-tacky boxes smaller. I want to re-think what sorts of public and private space are feasible.

My wife, some 15 years ago, designed what she called a multi-hogan. Hogans, as many of you know, are the buildings that the Navajo built and what she did, was to turn that into a house with some limited private space for families but also a lot of public space so that you could have privacy but you could have the sorts and resources that you need in your home, which we are not all going to be able to afford separately. One of the things I'm trying to promote is the competition which would deal with the whole issue of how the many ways public and private space could be matched. We need to look at the whole issue of what we mean by downtown. The degree to which they are the way to go in the future or the degree to which we are going to go back to much smaller clusters. I want to suggest to you that the problem is that we will either achieve this change in the '80s, not all of it but begin to accept reality, or we are facing totally catastrophic breakdown of the social contract both internally and externally.

Now I choose my words with care. We are not going to be able to deliver what is necessary for this culture to work which is enough jobs for people and, increasingly, we are not going to be able to deliver what else is needed to make it work, which is enough homes for people. You talked about the problem at the bottom end of the market. There is a problem which is already acute; literally, people cannot find space in which to live. 'Bag people,' who were a small minor problem, are becoming a significant issue. They are people who have no home of their own, no place to live. That problem could worsen with enormous rapidity unless we start thinking about how we house people in the sort of world we are going to have.

The anger that exists in this culture is very great because we promised to deliver certain things and we are failing. I see no reason to believe that we are going to stop failing because we live in a society which simply cannot deliver maximum economic growth or even rapid economic growth into the future. President Reagan's policies are going to fail. They don't make sense. They don't make economic sense and we have no other options. We've already seen the Keynsian policy fail.

How do we image and create new policies? We recognize that our crucial problem is a management problem, that the management styles we have were designed for stable conditions. The bureaucracies work if and only if the world is stable. If you want to deal with rapidly changing diverse conditions, you must have the capacity for people to make the necessary decisions on the spot in terms of the actual realities and, in this case, working with the home owner.

If everybody involved is in the business of building good housing, ensuring good rehab, making good decisions and taking risks, it will work. If everybody says, I'm going to be safe, I don't care if you have too big a furnace, that's what the rules say; no you cannot have one heating system, it isn't enough and it has to be one of the formal heating systems because otherwise your house doesn't meet code. I can go on. I was with somebody yesterday who has just built a solar house, and who, on the energy side of it alone, has had to spend thousands of additional dollars because of the way the codes are written. Because we won't think about that house and that house's needs and the willingness of that person to take risks and above all interestingly, the willingness of that person to act as an intelligent human being.

One of the ways we calculate house losses is in terms of how could you run that house most inefficiently. He's put shutters on and they say, but you can't guarantee he'll close the shutters. Well what did he put them there for? We have a management problem. It can only be solved by new management styles and we know something about them. They are achieved through linkage, they are achieved through people with the problem sitting down together and talking with each other about human beings and not about roles. In other words, you don't sit down and say, I'm a builder, this is what I'm saying as a builder. You say, I'm a human being and I'm dealing with this issue and how do we make it work.

There are very different ways of looking at things. My problem, after being in this game for 25 years, is I have continued to look for ways in which the human race can survive without growing up. I can't find them. Now maybe they are there but I can't find them. So the challenge from me to you is, what would this whole area of activity look like if we stopped assuming that we are opponents, if we stopped assuming that we have to fight each other, if we stopped assuming that everybody is out to make a quick buck, but recognize that a few people are and we have to deal with them but we don't have to wreck the whole system in order to stop them making a quick buck. Then I think we might actually begin to be able to house people because we waste an awful lot of money in this business, an incredible amount of money because we are locked in and everybody is afraid to give anywhere because if they start giving, they are afraid that they will be the only person who gives and they are going to end up worse off.

We should get to the point where everybody recognizes that giving is in their best interest and I think we've heard why it's in their best interest. The market is in a shambles and I don't think it's going to improve dramatically until we begin to be able to produce more house for less dollars and I hate to see my young friends buying houses that they can't afford and paying all of their salaries or all of one salary to pay a mortgage. It's not a good way to go.